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REPORTS

ON THE

VIENNA UNIVERSAL EXHIBITION

OF

1873.

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PART I.

Presented to both Houses of Parliament by Command of Her Majesty.

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LONDON:
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PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1874.

[C.—1072.] *Price* 5*s*. 9*d*.

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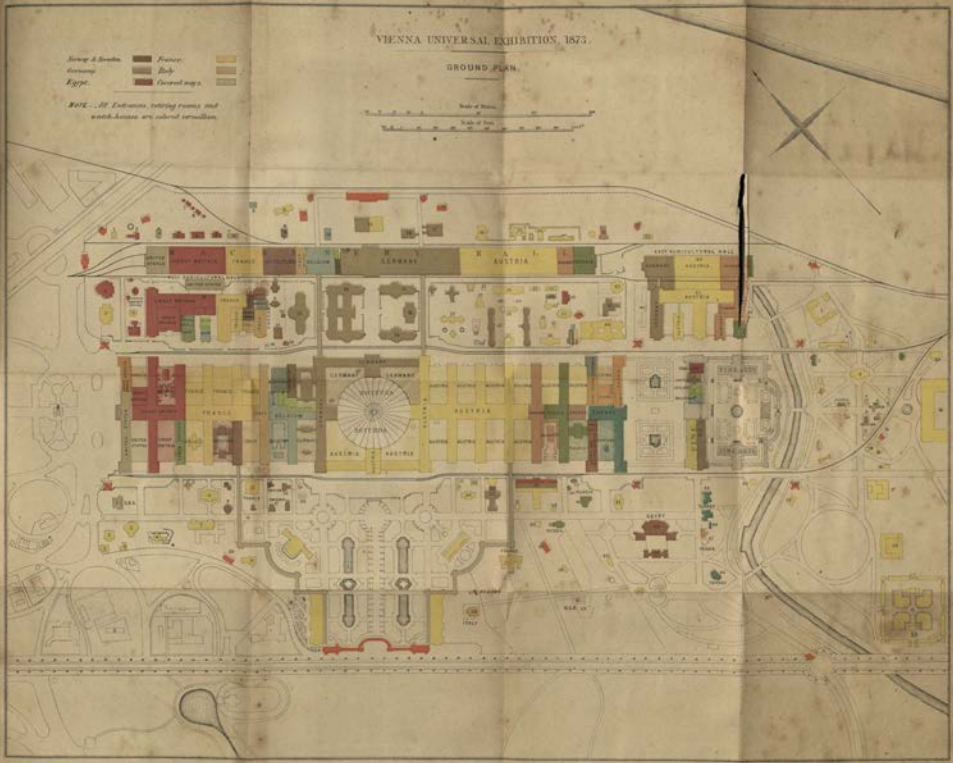
" " " AGRICULTURAL HALL.
" " " ROTUNDA.
ROYAL BRITISH COMMISSION OFFICES.
WORKMEN'S COTTAGES.

VIENNA UNIVERSAL EXHIBITION, 1873.

GROUND PLAN.



KEY TO GROUND PLAN.

LIST OF PRINCIPAL BUILDINGS IN THE EXHIBITION GROUNDS.

Behind the Machinery Hall.

1. Bakery of Carl Heilfinger.
2. Boiler House.
2*a*. Dows, Clark's Aërated Waters' Factory.
3. Waiting Rooms.
4. American Boiler House.
5. English Workmen's Dwellings.
5*a*. Bradford's Laundry.
6. English Boiler House.
7. English Gas Factory.
8, 9. Gas Works.
10. French Boiler House.
11. Repairing Shops.
12. Swiss Boiler House.
13. Watch House.
14. Belgian Boiler House.
15. Pavilion of the Trade of the World.
16. German Boiler House.
17. German Pavilion for Brickmaking and Ice-making Machines.
18. Watch House.
19. Austrian Boiler House.
20. Northern Railway Pavilion.
21. North Western Railway Pavilion.
22. Pumping Station.
23. Mr. Ringhoffer's Pavilion.

On the other Side of the Heustadl Waters.

1. Entrance.
2. Kriau (Sacher's Restaurant).
3. Collective Exhibition of the Styrian Proprietors of Forests.
4. Shareholder's Company for Forest Industry.
4*a*. Shareholder's Company "Agricola" (Farming).
5. Russian Peasant's Hut.
6. Machinery Building.
7. Swedish Peasant's Hut.
8. Pavilion of Hungarian Forest Produce.
9. Cracow Peasant's Hut.
10. Von Ganahl's Farmhouse in Feldkirchen.
11. Hungarian Peasants' Huts:—
    a. Hungarian.
    b. Saxon.
    c. Geydelerhouse.
    d. Roumanian.
    e. Geydelerhouse.
    f. Soldiers' Houses of the Military Frontier.
12. Baron Pittel's Stable.
13. Cloak Room.
14. Borkowsky, Labourer's Cottage.
15. Chevalier de Mlodecky's Farm House.
16. Walne, and Alpine Hut.
17. Farm of the Agricultural Society of Vienna.
18. Horse and Cattle Show.
19. Vienna Photographers' Association.
20. Military Building Yard.
21. Military Barracks.

Between the Machinery Hall and the Industrial Hall.

1. Western Entrance.
2. English Restaurant.
3. Court Bakery of Roman Uhl.
4. Cook's Tourists' Pavilion.
5. Aveling and Porter's Office.
6. Watertower.
7. English Commissioners' House.
8. Western Agricultural Hall (including Great Britain).
9. Cloak Room.
10. Swedish Restaurant (Theodor Blanche).
11. Norwegian Fishery.
12. Lapland Hut (Laplatta).
13. Swedish Fishery.
14. Norwegian Garden Pavilion (Jacoben & Haneburg).
15. German School House.
16. German Empire (Mining Industry).
17. Dreher's Brewery Pavilion.
18. The Duke of Saxe-Coburg-Gotha's Pavilion.
19. Prince J. Adolphus Schwarzenberg's Pavilion.
20. Pavilion Mauthner (Son).
21. Jacob Mung & Company (Pavilion).
22. Waagner's Pavilion for Stable Fittings.
23. Curti, Cement Obelisk.
23*a*. Chailly House of Artificial Stone.
24. Industrial Society of Prague, formerly Danck.
25. Vordernberg-Koflach Mining Industry Company.
26. Pavillion of the Innerberg Shareholders' Company (Mining Industry).
27. Kärnter Brewery, Silberberg (Bar).
28. Carinthian Mining Industry Society (Huttenberger).
29. Mr. Bosch's Pavilion.
30. Vincent Wenzel's Pavilion for Fireproof Roofing.
31. Pavilion, Steffen's (Machine).
32. Witkowitz Railway Bridge.
33. Baron de Rothschild's Pavilion.
33*a*. Lederer & Neselyi.
34. English Restaurant.
35. Pavilion of the Shareholders' Company for the construction of Bridges and Roads.
36. John Schubert's Pavilion.
37. Steinor, Tyrolese Cottage.
38. Imperial and Royal State Railway.
39. Pavilion for the Representation of the History of Inventions in Women's Work.
40. Minister of Agriculture Pavilion.
41. Cloak Room.
42. Alsace-Lorraine Farmhouse.
43. Danubian Steam Navigation Company.
44. Wine-Tasting Hall (Kost-Halle).
45. Eastern Agricultural Hall.
46. Cloak Room.

Before the Industrial Palace.

1. American Restaurant of Mr. Kune.
2. Private Brewery of Pilsen.
3. Shareholders' Brewery of Pilsen.
4. Hungarian Csarda.
5. American Kiosk.
6. New Free Press.
7. Liesing Beer Saloon.
8. Rosshard's Swiss Bar.
9. Swiss Music Hall.
10. Cloak Room.
11. Boiler House.
12. French Restaurant.
13. Dows, Clark, and Co.'s Sodawater Pavilion.
14. Prince of Monaco's Pavilion.
15. Swedish Hunting Box.
16. Swedish Army Exhibition.
17. Swedish School House.
18. Pavilion of the Domain Finspong.
19. Pavilion of Mining Products.
20. Monument of Wasserburger.
21. Martin Kien, Portable Dwelling House.
22. Kiosk of the Southern Railway.
23. Chevalier de Stark's Pavilion.
24. Pavilion of the Savings Bank.
25. Pavilion of the Little Child.
26. Pavilion for Metal Industry.
27. Austrian Medicinal Springs (Sauer Quelle).
28. Specialiten Tabac Trafik.
29. Russian Pavilion of Mr. Sidorot.
30. Russian Pavilion of M. Reimers.
31. Pavilion of the Tsar of Russia.
32. Russian Restaurant of Mr. Engel.
33. Charles Hochstetter—Products of the Perlmoser Cement Manufactory, Limited.
34. Waiting Rooms.
35. French Restaurant, "Trois Frères Provencaux."
36. Italian Restaurant. } Natale
37. Italian Wine Saloon. } Biffi of Milan.
38. Styrian Wine House.
39. Wigwam.
40. Orchestra.
41. Austrian Lloyd's.
42. Egyptian Buildings.
43. Waagner Glasshouse.
44. Oriental Clubhouse of Dr. Hardt.
45. Lighthouse of the Maritime Board. Semaphore and Fog Signal.
46. Turkish Buildings, House and Bazaar.
47. Persian Villa, Morocco Villa, Café Turc.
48. Restaurant of Mr. Arnstein of Trieste.

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ROYAL COMMISSION.

[EXTRACT from the *London Gazette* of May 7, 1872.]

THE Lords of the Committee of Council on Education have received from Her Majesty's Secretary of State for the Home Department a Royal Commission, of which the following is a copy, which Her Majesty has been graciously pleased to issue, appointing Commissioners to represent British and Colonial Exhibitors at the International Exhibition to be held at Vienna in 1873.

VICTORIA R.

VICTORIA, by the Grace of God of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith;

TO Our most dear Son Albert Edward, Prince of Wales, Knight of Our Most Noble Order of the Garter;

Our right trusty and well-beloved Councillor Sir Andrew Buchanan, Knight Grand Cross of Our Most Honourable Order of the Bath, Our Ambassador Extraordinary and Plenipotentiary at the Court of Vienna, or Our Ambassador Extraordinary and Plenipotentiary at the Court of Vienna for the time being;

Our right trusty and entirely-beloved cousin and Councillor George Frederick Samuel, Marquess of Ripon,* Knight of Our Most Noble Order of the Garter, President of Our Most Honourable Privy Council, or the President of Our Most Honourable Privy Council for the time being;

Our right trusty and right well-beloved cousin and Councillor Francis Thomas de Grey, Earl Cowper, Knight of Our Most Noble Order of the Garter;

* Lord Aberdare succeeded the Marquess of Ripon, K.G., as Lord President of the Council on 12th August 1873; the Duke of Richmond, K.G., succeeded Lord Aberdare on 24th February 1874.

Our trusty and well-beloved Henry George Charles Gordon Lennox, Esquire (commonly called Lord Henry George Charles Gordon Lennox);

Our right trusty and well-beloved John Emerick Edward, Baron Acton;

And Our trusty and well-beloved Henry Arthur Brassey, Esquire, greeting.

Whereas it has been notified unto us through Our Secretary of State for Foreign Affairs, that His Imperial and Apostolic Majesty, The Emperor of Austria, has decreed that an Universal Exhibition of the Works of Industry and Agriculture, as well as of the Fine Arts, shall be held at Vienna in the year one thousand eight hundred and seventy-three:

And whereas it is Our wish that such Exhibition shall afford full and suitable representations of the Industry and of the Fine Arts in Our United Kingdom of Great Britain and Ireland, Our Colonies and Dependencies in Europe, Asia, Africa, America, and Australasia, and that Our subjects shall take part in such Exhibition:

Now know ye, that We, considering the premises, and earnestly desiring to promote the success of the said Exhibition, and reposing great trust and confidence in your fidelity, discretion, and integrity, have authorised and appointed and by these presents do authorise and appoint you Our said most dear Son Albert Edward, Prince of Wales, together with you Sir Andrew Buchanan, or Our Ambassador Extraordinary and Plenipotentiary at the Court of Vienna for the time being; George Frederick Samuel, Marquess of Ripon, or the President of Our Most Honourable Privy Council for the time being; Francis Thomas de Grey, Earl Cowper; Henry George Charles Gordon Lennox, Esquire, (commonly called Lord Henry George Charles Gordon Lennox); John Emerick Edward, Baron Acton; and Henry Arthur Brassey, Esquire, to be Our Commissioners to advise Us upon the best mode by which the products of Industry and the Fine Arts of the United Kingdom, Our Colonies, and Dependencies, may be procured and sent to the said Exhibition.

And, furthermore, We do by these presents give and grant to you, or any three or more of you, full power and authority to nominate and appoint other persons to be Commissioners for the said Exhibition.

And Our further will and pleasure is, that you, or any three or more of you, when and so often as need or occasion shall require, so long as this Our Commission shall continue in force, do report to Us in writing, under your hands and seals respectively, all and every the several proceedings of yourselves had by virtue of these presents.

And lastly, We do by these presents ordain that this Our Commission shall continue in full force and virtue until the close of the said Exhibition, and that you Our said Commissioners, or any three or more of you, shall and may from time to time, and at any place or places, proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment.

And for the purpose of aiding you in such matters, We hereby appoint Our trusty and well-beloved Francis Philip Cunliffe Owen, Esquire, to be Secretary to this our Commission.

Given at Our Court at Saint James's the twenty-ninth day of April one thousand eight hundred and seventy-two in the thirty-fifth year of Our Reign.

By Her Majesty's Command,

H. A. BRUCE.

[EXTRACT from the *London Gazette* of July 19, 1872.]

AT a meeting held at Marlborough House, on Thursday the 18th July 1872, Her Majesty's Commissioners for the Vienna Exhibition, in accordance with the powers vested in them by the Royal Commission, appointed—

His Serene Highness Captain Count Gleichen, R.N.;
The Right Honourable Hugh C. E. Childers, M.P.;
Sir Anthony de Rothschild, Bart.;
Sir Richard Wallace, Bart.;

*Sir Watkin Williams Wynn, Bart., M.P., President of the Royal Agricultural Society of England, or the President of the Royal Agricultural Society of England for the time being;

Sir Francis Grant, President of the Royal Academy of Arts, or the President of the Royal Academy of Arts for the time being;

Charles B. Vignoles, Esq., President of the Institution of Civil Engineers, or the President of the Institution of Civil Engineers for the time being;

to be Royal Commissioners in addition to, and together with them, the Commissioners appointed on the 29th April 1872, for the purpose of promoting the success of the Universal Exhibition to be held in Vienna in 1873.

[EXTRACT from the *London Gazette* of July 23, 1872.]

IN the list of Royal Commissioners for the Vienna Universal Exhibition of 1873 appointed on the 18th July, for Charles B. Vignoles, Esq., read Thomas Hawksley,† Esq., President of the Institution of Civil Engineers or the President of the Institution of Civil Engineers for the time being.

[EXTRACT from the *London Gazette* of August 16, 1872.]

AT a meeting held at Marlborough House on Wednesday the 14th of August 1872 Her Majesty's Commissioners for the Vienna Universal Exhibition of 1873, in accordance with the powers vested in them by the Royal Commission, appointed—

His Serene Highness The Duke of Teck, G.C.B., to be a Royal Commissioner in addition to, and together with them, the Commissioners appointed on the 29th April 1872, for the purpose of promoting the success of the Vienna Exhibition.

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* Lord Cathcart succeeded Sir Watkin Wynn as President of the Royal Agricultural Society in July 1872. Mr. Edward Holland succeeded Lord Cathcart in July 1873.

† Mr. Hawksley was succeeded as President of the Institution of Civil Engineers by Mr. Thomas Elliot Harrison in January 1874.

REPORT

OF

HER MAJESTY'S COMMISSIONERS

FOR THE

VIENNA UNIVERSAL EXHIBITION OF 1873,

TO THE

RIGHT HON. RICHARD ASSHETON CROSS, M.P.,
&c. *&c.*
One of Her Majesty's Principal Secretaries of State.

SIR,

HER Majesty having been most graciously pleased to appoint us, by a Royal Commission, dated the 29th of April 1872, to act as Commissioners to advise Her Majesty upon the best mode by which the Products of Industry and the Fine Arts of the United Kingdom, its Colonies and Dependencies, might be procured and sent to the Vienna Universal Exhibition of 1873, we have now the honour to transmit to you our Report, in order that it may be duly laid before Her Majesty.

It was our privilege throughout the whole term of the Exhibition to receive from their Imperial Highnesses the Archdukes Charles Louis and Rainer, who were respectively Protector of the Exhibition and President of the Imperial Commission, the most cordial support and assistance, for which we desire in the fullest manner to express our acknowledgments.

The determination of the Austrian Government to hold an International Exhibition, to be opened on the 1st of May 1873, was announced at Vienna by the Archduke Rainer,

at a meeting held in the Hall of the Imperial Academy of Sciences on the 17th September 1871. The Archduke, in his preliminary address, as President, to the Imperial Commission, explained that the proposed Exhibition was intended to represent the state of culture of the present time, and the entire sphere of national economy, and to promote its further progress; and His Imperial Highness referred to the inauguration by Great Britain of these peaceable contests among nations, and made special and graceful allusion to the Prince Consort, their originator, "to whom civilization is "so much indebted."

On the 7th of March 1872, Count Beust expressed to Her Majesty's Secretary of State for Foreign Affairs the great anxiety of his Government that British industry should be worthily represented at the Vienna Exhibition, and pointed out that, having in view the onerous preliminary work which would devolve on the Royal Commission, it was expedient that its executive functions should commence with as little delay as possible.

Accordingly, soon after the issue of Her Majesty's warrant appointing this Commission, a communication was addressed to the Lords Commissioners of Her Majesty's Treasury, enclosing an estimate of expenses, which in accordance with instructions received from Her Majesty's Government were to be restricted to the usual expenses of a temporary Commission, having offices in London and Vienna. This estimate, approved by the Lords Commissioners of Her Majesty's Treasury on the 17th July 1872, was submitted to Parliament and formally sanctioned.

Her Majesty's Commissioners held their first meeting on the 18th July, and after the appointment of the additional Commissioners, whose names are given in the "London Gazette" of the 19th of July, we proceeded at once to a settlement of the preliminary details connected with the formation of the British Section of the Exhibition, and in the first place took into consideration the general regulations issued by the Austrian Imperial Commission, by which, for the first time in the history of Great International Exhibitions, rent was to be charged for space occupied by Exhi-

bitors. There being no public funds to provide for this charge, it was necessary that intending Exhibitors should be prepared to meet the cost at the rates indicated by the Austrian General Direction.*

We also took steps to make the intended Exhibition to be held at Vienna generally known. Special letters of invitation were addressed to the Secretaries of State for India and the Colonies, and the various Societies for the Promotion of Science and Art and Agriculture, to secure their co-operation, and communications were sent to all the Chambers of Commerce in the United Kingdom, and also to the manufacturers and producers who had taken part in previous Exhibitions.

In the case of India the Secretary of State in Council (the Duke of Argyll) authorised such action to be taken as procured the most extensive and complete display of Indian produce and manufactures which has ever been sent to an International Exhibition held on the Continent. We gladly take this opportunity of expressing our sense of the cordial co-operation given us in all the great centres of industry in the Indian empire, which resulted in such an exhaustive and attractive representation. We had the benefit throughout the term of the Exhibition of the large experience of Dr. Forbes Watson, who as Chief Commissioner was charged by the Secretary of State with the superintendence of the Indian section, and also of the co-operation of Colonel Michael, the Acting Commissioner, at Vienna, for India.†

The Secretary of State for the Colonies (the Earl of Kimberley) at the late period at which it was possible to bring the Exhibition under the notice of the various Colonial

	£	s.	d.	
* Industrial hall	1	0	0	per square meter, = 10·75 English square feet.
Courtyard	0	8	0	
Agricultural hall	0	8	0	
Machinery hall	0	8	0	
Covered space in courts	0	4	0	
Parks	0	2	0	

† Commissioners for India.—Dr. Forbes Watson, Colonel Michael, Captain Campbell Walker. Secretary, Lieut. J. R. Royle.

Governments, took such steps as secured important representations from the Bahamas, Cape of Good Hope and Natal, Ceylon, Jamaica, Mauritius, New Zealand, Queensland, South Australia, Trinidad, Victoria, and the West Coast of Africa. A committee of advice was appointed,* which rendered important services in advising us in connection with the Colonial section.

A full account of the action taken by the Colonial Office and also of the services rendered to the Exhibition by the Commissioners† appointed by the colonies above mentioned, will be found in the Report by Mr. William Robinson, whose valuable services as Special Commissioner for the Crown Colonies and Superintendent of the Colonial Section were placed at our disposal by the Secretary of State.

The Royal Academy took special action to secure a proper representation of British Fine Art, and made a direct appeal to each of its members.

On the recommendation of the Committee for the Fine Arts, whose general assistance to Her Majesty's Commissioners cannot be too highly appreciated, we caused letters to be addressed, which were signed by the President of the Commission, to owners of Works of Art, requesting them to lend Pictures and Sculpture to the Exhibition. We desire here to express our acknowledgments to Her Most Gracious Majesty the Queen and to the other proprietors of Works of Art for the liberality with which our applications were responded to. An insurance on these works was effected for a sum of 100,000*l.*, such insurance covering all risks from the time each work was removed from the residence of its

* London Committee for the Colonies.—The Marquess of Ripon, K.G.; Right Hon. Hugh C. E. Childers, M.P.; Sir John Rose, Bart., K.C.M.G.; Sir Chas. Cowper, K.C.M.G.; Sir James McCulloch, K.C.M.G.; Sir Francis Smith; Mr. P. G. Julyan, C.B. (now Sir P. G. Julyan, C.B., K.C.M.G.); Mr. Henry A. Brassey, M.P.; Mr. Richard Daintree; Mr. Francis S. Dutton, C.M.G.; Dr. I. E. Featherston; Mr. W. Robinson; and Mr. W. C. Sergeaunt.

† Commissioners for the Colonies.—New South Wales, Sir Daniel Cooper, Bart.; Victoria, Sir James McCulloch, K.C.M.G.; New Zealand, Sir Charles Clifford and Mr. I. E. Featherston; Queensland, Mr. R. Daintree, Dr. Kirchner, and Mr. A. Hodgson; Cape Colony and Natal, Mr. Julius Mosenthal; South Australia, Mr. Francis S. Dutton, C.M.G.

proprietor till the time of its return thereto. The average insurance was at the rate of 2*l.* per cent. The insurance was effected at Lloyd's, the underwriters agreeing to accept Mr. Richard Redgrave, R.A., Surveyor of the Queen's pictures, as the sole arbitrator. We desire to express our acknowledgments for the valuable advice and attention given by Mr. Redgrave. Mr. F. B. Barwell, as the executive officer charged with the preliminary duty of collecting the Works of Art and arranging them for exhibition at Vienna, rendered us good service throughout. The total claim on the underwriters, which was for damage done in transit to a group of sculpture, amounted only to 6*s.* 6*d.* per cent. on the whole sum insured.*

The representation of British Fine Art could not be secured upon the principle of payment by contributors, nor did the Parliamentary votes include any sum for this purpose. We therefore considered a proposal made by a member of the Commission,† who asked permission to defray all charges in order that Great Britain might be worthily represented under this section of the Exhibition, to which proposal we gladly acceded. In addition to this provision, other members of the Commission defrayed from time to time certain necessary charges, which alone enabled the British portion of the Exhibition to be punctually opened on the 1st of May. At the opening ceremonial H.R.H. the President of the Commission, accompanied by several members of the Royal Commission, were present on the part of Great Britain.‡ It became evident to those Commissioners who were assembled at Vienna for executive purposes that great sacrifices had been made by manufacturers to

* Fine Arts Committee.—H. S. H. Count Gleichen, Captain R.N.; Sir Richard Wallace, Bart., M.P.; Sir Francis Grant, P.R.A.; Sir William Boxall, R.A.; Sir John Gilbert, A.R.A.; Mr. Henry Warren; Mr. Richard Redgrave, R.A.; Mr. W. Calder Marshall, R.A.; Mr. Samuel Cousins, R.A.; and Mr. Wm. Smith, F.S.A. Secretary, Mr. Frederick B. Barwell.

† Sir Richard Wallace, Bart., M.P.

‡ Commissioners present at the Opening Ceremonial.—H.R.H. the Prince of Wales, K.G.; the Right Hon. Sir Andrew Buchanan, G.C.B.; H. S. H. Capt. Count Gleichen, R.N.; The Earl Cowper, K.G.; Sir Anthony de Rothschild, Bart.; Sir Richard Wallace, Bart., M.P.; Mr. Henry A. Brassey, M.P.

insure a worthy representation from this country. To enable the British section to be maintained, it became necessary to procure, in addition to 6,000*l.* (the sum at first voted) further Parliamentary grants. Representations were accordingly made by Her Majesty's Commissioners to the Treasury, and sums have been authorised, amounting to 28,760*l.* of public money, a considerable reduction on the cost of the Paris Exhibition of 1867, when the expenditure, exclusive of certain departmental charges, was 120,154*l.*

The Royal Agricultural Society nominated a working committee, under the presidency of the Earl of Cathcart, to further the interests of the Agricultural Section, and to the valuable and experienced aid rendered by that committee is to be solely attributed the advantageous arrangements made for the complete and important display of agricultural appliances which so deservedly attracted attention in the Exhibition.*

As the space in the Agricultural Hall assigned in the first instance to Great Britain was most inadequate, we took steps to procure a considerable addition thereto, and eventually 4,500 square metres were placed at our disposal in place of the 2,000 originally allotted.

The representation of live stock formed part of the scheme of the Exhibition, and the necessary communications were made to the British producers interested in the subject.

One of the earliest duties of Her Majesty's Commissioners was to furnish Exhibitors with all particulars as to the routes for the transport of goods, and to obtain for them the most moderate rates. Tariffs from the principal carrying agents were prepared giving scales of rates for the various routes, some of which were as low as 30*s.* per ton. By this means Exhibitors were enabled to select the route which seemed most advisable to them. Further than this, it was important to secure an exceptionally low fare for the benefit of the workmen and artisans proceeding to Vienna from this country on work connected with the Exhibition. The various railway

* Committee for Agriculture.—The Earl Catheart; Mr. C. Wren Hoskyns, M.P.; Mr. B. T. Brandreth Gibbs; and Mr. R. C. Ransome.

companies having been communicated with, an exhibitor's railway ticket to Vienna and back, available for any period throughout the year, was secured, and a sum of nearly 3,000*l.* was in the aggregate saved to the Exhibitors, since under the ordinary passenger arrangements, they must have paid for their tickets more than double the price at which they were procurable at the office of the Commission.

Her Majesty's Commissioners considered it desirable to facilitate commercial relations likely to arise from the Exhibition, by causing the list of Austrian customs' duties to be translated as far as such duties concerned the objects included in the classification of the Exhibition. This document was largely used by Exhibitors, and has been generally beneficial even beyond the precise scope of the Exhibition. To this publication was added a translation of the Treaty of Commerce which expires in 1876; also of all the Austrian laws and regulations connected with patents and the protection of designs, trade marks, &c. An International Patent Congress in connexion with the Exhibition having been announced for the purpose of assimilating the laws on patents, with the sanction of the Lords Commissioners of Her Majesty's Treasury, Mr. Webster, Q.C., was invited to proceed to Vienna and to attend this Congress on behalf of the Commission. His Report will be found in volume IV. Before Mr. Webster's appointment, several British manufacturers sought the advice of the Commission in order to secure the protection of their designs. In the Appendix to Mr. Webster's Report an acknowledgment is placed on record of the services rendered by the Commission in this respect to the general body of the British Exhibitors, as shown by the statements made by Messrs. J. and E. Atkinson, and by Messrs. J. E. and W. Christy and Co.

A large number of Exhibitors liberally co-operated with us by contributing specimens of their manufactures in order to secure the completion of the British Section. Without such aid, which in many cases imposed considerable inconvenience and cost upon the manufacturer, it would have been impossible for Her Majesty's Commissioners to have carried out arrangements the success of which has been universally admitted.

Letters were addressed to the Society of Arts, the Royal Academy, the Royal Agricultural Society, and the Institution of Civil Engineers, requesting that they would indicate qualified persons who would be willing to proceed to Vienna to represent this country on the International Jury.

The Council of the Society of Arts took active steps in this direction, not only by communicating to Her Majesty's Commissioners the names of recognized authorities, but also by directly communicating with them respecting the Exhibition. The Institution of Civil Engineers afforded valuable assistance of a similar description.

We are glad to avail ourselves of this opportunity to express our thanks to these Societies for their ready co-operation.

A combination of circumstances rendered it unusually difficult to procure a fitting representation of Great Britain on the International Jury,—its peculiar composition, the great distance from London to Vienna, the protracted time to be occupied by a labour in which 700 members had to adjudicate on the claims of about 50,000 Exhibitors, and above all, a season singular in its unhealthiness, had all to be contended against, and Her Majesty's Commissioners were therefore to be esteemed fortunate in securing the assistance of the gentlemen named on pp. 18–20, the result of whose labours is shown by the fact that 26 Diplomas of Honour and 420 Medals were awarded to British Exhibitors exclusive of Honourable Mentions and of the awards to India and the Colonies.

His Royal Highness the Field Marshal Commanding in Chief was good enough to cause the services of Lieut. Anstey, R.E., to be placed at our disposal as Official Delegate to the International Jury, and he rendered that body much valuable assistance.

Her Majesty's Commissioners have caused the following Reports to be prepared on special subjects connected with the Exhibition, and they desire to express their thanks to the Reporters for their valuable co-operation, as well as to the gentlemen who have contributed much important information on subjects cognate to the Exhibition, which has been printed in the form of Appendices to the special reports.

Congresses in connection with the Exhibition having reference to the production of flax and to the uniform numbering of yarn were held at Vienna, and notices of the meetings of such Congresses, with translations of the documents issued, were sent by Her Majesty's Commissioners to the particular Chambers of Commerce in Great Britain interested in the subjects under discussion.

Although no official delegate was appointed by this Commission, the proceedings of the Congresses were carefully noted on our part, and reports have been compiled with reference to them.

Her Majesty's Commissioners are indebted to Dr. Von Banhans, the Minister of Commerce for Austria, who, upon the suggestion of the General Direction of the Exhibition, granted free telegraphic and postal communication, the advantages of which between cities so far apart as Vienna and London can scarcely be over estimated; and we are further indebted to Her Majesty's Government, who secured similar advantages throughout the whole of last year between the London and Vienna offices of the Commission.

We are under many obligations to His Excellency Baron de Schwarz-Senborn, the Director-General of the Exhibition, for the courteous attention he uniformly gave to the applications made to him in the interest of British exhibitors, and for the general assistance afforded to them and to this Commission.

Her Majesty's Commissioners are informed that the customs duties paid on the English goods exhibited at Vienna, and sold at the close of the Exhibition for the Austro-Hungarian Empire, exceeded those paid by any other country. There is no question that the Exhibition has had the effect of making the specialties of British manufacture more widely known in Austrian and even in Eastern markets, and it appears to us beyond doubt that its direct results upon the industry of the British Empire have been such as fully to justify the expenditure incurred by this country, while considerable advantages may be expected to accrue to our producers beyond those more immediately resulting from the Exhibition.

We cannot conclude this Report without expressing how much we have been indebted to our Secretary, Mr. Philip Cunliffe Owen. The experience gained by Mr. Owen in previous Exhibitions made his services on this occasion most valuable; while the tact and indefatigable industry with which he addressed himself to the onerous duties devolving upon him contributed in no slight measure to the successful issue of our labours. We have reason to know that the high opinion which we have formed of Mr. Owen is shared by all those with whom his official position brought him in contact.

ALBERT EDWARD, P.
ANDREW BUCHANAN
TECK.
GLEICHEN.
RICHMOND.
COWPER.
HENRY GORDON LENNOX.
ACTON.
HUGH C. E. CHILDERS.
ANTHONY DE ROTHSCHILD.
RICHARD WALLACE.
FRANCIS GRANT.
HENRY ARTHUR BRASSEY.
THOMAS ELLIOT HARRISON.
EDWARD HOLLAND.

Marlborough House,
12 June 1874.

Offices of the Royal Commission, for the Vienna Universal Exhibition of 1873, 41, Parliament Street, afterwards 5, Craig's Court, Charing Cross, London; 66, Praterstrasse and Royal Commission Pavilion, Vienna.

COMMISSION FOR INDIA.

Appointed by the Secretary of State for India in Council.

Chief Commissioner and Director	Dr. FORBES WATSON.
Commissioners	Colonel MICHAEL. Capt. CAMPBELL WALKER.
Secretary	Lieut. J. R. ROYLE.

Commissioner for the Crown Colonies and Superintendent of the Colonial Section — WILLIAM ROBINSON, Esq.

COMMISSIONERS

Appointed by the Colonial Governments.

New South Wales	Sir DANIEL COOPER, Bart.
Victoria	Sir JAMES MCCULLOCH.
New Zealand	Sir CHARLES CLIFFORD. Dr. I. E. FEATHERSTON.
Queensland	R. DAINTREE, Esq. Dr. KIRCHNER.
Cape Colony and Natal	JULIUS MOSENTHAL, Esq.
South Australia	FRANCIS S. DUTTON, Esq.

G. PHILLIPS BEVAN, Esq., Agent in Vienna appointed by the Australian Commissioners.

COMMITTEE FOR THE COLONIES.

Appointed by Her Majesty's Commissioners on the 26th July, 1872.

The Most Honourable the Marquess of RIPON, K.G.
The Right Hon. HUGH C. E. CHILDERS, M.P.
Sir JOHN ROSE, Bart., K.C.M.G. (Canada).
Sir CHARLES COWPER, K.C.M.G. (New South Wales).
Sir JAMES MCCULLOCH (Victoria).
Sir FRANCIS SMITH (Tasmania).
P. G. JULYAN, Esq., C.B.
HENRY A. BRASSEY, Esq., M.P.
RICHARD DAINTREE, Esq., (Queensland).
FRANCIS S. DUTTON, Esq., (South Australia).
Dr. I. E. FEATHERSTON, (New Zealand).
WILLIAM ROBINSON, Esq.
W. C. SERGEAUNT, Esq.

FINE ARTS COMMITTEE.

Appointed by Her Majesty's Commissioners on the 26th July, 1872.

His Serene Highness Count GLEICHEN, Captain R.N.
Sir RICHARD WALLACE, Bart., M.P.
Sir FRANCIS GRANT, President of the Royal Academy.
Sir WILLIAM BOXALL, R.A., Director of the National Gallery.
Sir JOHN GILBERT, A.R.A., President of the Society of Painters in Water Colours.
HENRY WARREN, Esq., President of the Institute of Painters in Water Colours.
RICHARD REDGRAVE, Esq., R.A., Inspector-General of Schools of Art.
W. CALDER MARSHALL, Esq., R.A.
SAMUEL COUSINS, Esq., R.A.
WILLIAM SMITH, Esq., F.S.A.

F. B. BARWELL, Esq., Secretary.

COMMITTEE FOR AGRICULTURE.

Appointed by the Royal Agricultural Society on the 13th August, 1872.

The Right Honourable the Earl CATHCART, President of the Royal Agricultural Society of England.
B. T. BRANDRETH GIBBS, Esq., Honorary Secretary, Royal Agricultural Society.
C. WREN HOSKYNS, Esq., M.P.
R. C. RANSOME, Esq., of Ipswich.

LIST OF JURORS APPOINTED BY H.M. COMMISSIONERS.

Members of the Council of Presidents.

The Right Honourable Sir ANDREW BUCHANAN, G.C.B., Her Majesty's Ambassador at the Court of Vienna, [President, Group XII., "Graphic Arts and Industrial Drawings"].
His Grace the Duke of MANCHESTER, [President, Group VII., "Metal Industry"].
Admiral Sir R. SPENCER ROBINSON, K.C.B., [Vice-President, Group VII., "The Navy"].
Lieut.-Colonel Sir HOWARD ELPHINSTONE, V.C., K.C.B., R.E., [Vice-President, Group XIII., "General Machinery"].
H. EDWARDS, Esq., M.P., [Vice-President, Group II., "Agriculture, including Agricultural Machinery"].
G. GOLDNEY, Esq., M.P., [Vice President, "Additional Exhibitions"].
W. H. MAXWELL, Esq., M.P. (Vice-President "Cattle").

*** C. W. Siemens, Esq., and Dr. Anderson acted on the Council of Presidents.

List of Jurors—*continued.*

No. of Group.	Nature of Exhibits.	Names of Jurors.
I.	Mining, quarrying, and metallurgy.	C. W. Siemens, Esq., F.R.S.
II.	Agriculture, horticulture, and forestry.	Colonel Michael, Madras Staff Corps. Dr. I. E. Featherston.
	Agricultural machinery -	Henry Vizetelly, Esq.
III.	Chemical industry -	Dr. Crace Calvert, F.R.S.
IV.	Substances of food as products of industry.	H. Sugden Evans, Esq.
V.	Textile industry and clothing.	George Chester Haworth, Esq. William D. Hertz, Esq. Briggs Priestley, Esq.
VI.	Leather and india-rubber industry.	David Richardson, Esq.
VII.	Metal industry - - -	F. A. Paget, Esq., C.E. John B. Hardman, Esq. W. H. Russell, Esq., LL.D.
VIII.	Wood industry - -	Alfred Jenoure, Esq., F.R.G.S. J. R. Royle, Esq.
IX.	Stone, earthenware, and glass industry.	Professor Archer, Director of Edinburgh Museum of Science and Art.
X.	Small-ware and fancy goods.	A. H. Mounsey, Esq., H.M. Embassy at Vienna.
XI.	Paper industry and stationery.	Wyndham Portal, Esq.
XII.	Graphic Arts and Industrial Drawing.	Rev. Muirhead Mitchell, H.M. Inspector of Schools.
XIII.	General machinery -	John Anderson, Esq., C.E., LL.D. G. C. V. Holmes, Esq.
XIV.	Philosophical and surgical instruments.	Charles Brooke, Esq., M.A., F.R.S.
XVI.	The Art of War - -	Lieut.-Colonel Goodenough, R.A., Military Attaché to H.M. Embassy at Vienna.

List of Jurors—*continued.*

No. of Group.	Nature of Exhibits.	Names of Jurors.
XVII.	The Navy - -	Rear-Admiral W. Houston Stewart, C.B., Controller of the Navy.
XVIII.	Civil engineering, public works, and architecture.	W. Lindley, Esq. Hutton Vignoles, Esq.
XIX.	The private dwelling-house	Edwin Chadwick, Esq., C.B.
XXI.	National domestic industry	C. McL. McHardy, Esq., Admiralty, Whitehall.
XXII.	Organisation and influence of museums.	Francis Clare Ford, Esq., Secretary of H.M. Embassy at Vienna.
XXIII.	Ecclesiastical Art -	J. Berger Spence, Esq.
XXIV.	Exposition des Amateurs	
XXV.	Fine Art of the present time.	
XXVI.	Education, teaching, and instruction.	The Rev. William Rogers. The Rev. J. G. C. Fussell, H.M. Inspector of Schools,
—	—	—
Additional Exhibitions.	Cattle Show. Horned cattle, sheep, and pigs.	W. H. Maxwell, Esq., M.P., Vice-President. M. Stewart, Esq. Lieut.-Col. Michael. J. W. Paine, Esq. C. Pegler, Esq. Professor Wrightson. R. C. Yeoman, Esq. John Kersley Fowler, Esq. Thomas Fulcher, Esq. Robert Russell, Esq. R. Kirbell, Esq. (Experts.)

Official Delegate,
T. H. Anstey, Esq., R.E.

Note.—Some of the Jurors could not, from unavoidable circumstances, proceed to Vienna.

EXECUTIVE STAFF.

P. CUNLIFFE OWEN, Secretary, Royal Commission.
A. J. R. TRENDELL* (Correspondence and Accounts).

H. SANDHAM† (Space and Arrangement).	J. H. CUNDALL (Machinery and Special Buildings).

FINE ARTS.

Superintendent - - - F. B. BARWELL.‡

COLONIES.

Superintendent - - WILLIAM ROBINSON.§

JURIES.

Official Delegate - - Lieutenant T. H. ANSTEY, R.E.

ASSISTANTS.

Dr. F. L. WEINMANN (German Clerk and Translator).	W. M. PIETERS (in charge of Transport Arrangements).

J. M. BRETT.
ERNEST CHARRINGTON.
ERNEST COOPER.
F. J. HODGKINSON.
FRITZ CUNLIFFE OWEN.
NEWMAN ROBINSON
(Book-keeper and Pay-Clerk).

Staff-Serjeant WRIGHT, R.E.	Inspector C. HAGEN, and Serjeant WINKLER, of the Metropolitan Police.
Lance-Corporal J. SNELLING, R.E.	
Lance-Corporal J. R. OWEN, R.E.	
LEWIS A. RITTMAN, Late Serjeant, R.E.	S. ALFORD (Messenger).

Messrs. Thomas Cook and Son received the appointment of "General "Passenger Agents to the Royal British Commission"; and the Great Eastern Railway (Rotterdam Route) and Messrs. Head and Elkan (Hamburg Route) were specially appointed carriers for the return of goods from the British section of the Exhibition.

* First Class Clerk, Science and Art Department.
† Assistant Keeper, South Kensington Museum. Mr. Sandham resumed his duties at the Museum on 5th August 1873.
‡ Occasional Art Inspector, Science and Art Department.
§ Principal Clerk, Colonial Office.

The British Commission is indebted to the following Firms for the Exhibits specified below, which were placed at their disposal for use in the Exhibition.

ADAMSON, D., & COMPANY, Newton Moor Iron Works, Hyde, near Manchester.—Two steam boilers of 40 horse-power each, one with steam shell plates, solid welded flue-rings and circulating pipes.

APPLEBY, BROTHERS, Emerson Street, Southwark, London.—Portable steam crane for lifting 3 tons, one for lifting 5 tons, and one for lifting 7 tons. Each of these cranes can perform the following operations by steam:—1. Lifting loads at different speeds, in proportion to weight; 2. Turning completely round in either direction without stopping or reversing the engines, so that the load may be lifted or lowered at the same time as it is being turned—the larger cranes have two speeds of turning; 3. Raising and lowering the jib head, thus altering the radius of the crane; 4. Travelling by steam along a line of railway of any gauge.

AVELING & PORTER, Rochester, and 72, Cannon Street, London.—Three-ton steam crane for roads; one steam traction engine and three waggons; one steam road roller of 7½ tons.

BARNARD, BISHOP, & BARNARDS, Norfolk Iron Works, Norwich.—Two bays of wought-iron palisade, designed by Alfred Barnard; wash-stand of wrought-iron, in the style of the fourteenth century; candle holder; flower stand of wrought-iron; wrought-iron dressing table, with looking-glass (the ornamental parts of this are of iron bent cold); studies from nature in wrought iron, a bracket of wrought iron, all designed by T. Jeckyll, Esq., F.R.I.B.A.; reading stand of wrought-iron, designed by Alfred Barnard; 22-inch improved geared lawn mower, fitted for a donkey; and 30-inch improved geared lawn mower, fitted for a pony.

BLACKWOOD & SONS, Edinburgh.—Educational and other books.

BRADFORD, T., & COMPANY, 63, Fleet Street, London.—Model of laundry house, such as would be suitable for a family mansion, and fitted up with Bradford's patent apparatus for washing, boiling, rinsing, blueing, wringing, and drying the clothes, the system adopted in conjunction with these appliances ensuring the absolute cleanliness and good colour of the fabric, with great economy of labour and materials employed in the washing process; and as proved by the reports of several large public establishments in London, effecting a saving of 50 per cent. in the wear and tear of the fabric. As might be seen upon inspection, one small fire supplies all the hot water, dries the clothes, and also heats the smoothing and polishing irons for finishing the linen. Many other similar laundries have been built upon the same model in various parts of England, including one upon a large scale adjoining the Crystal Palace, London, which employs some 70 women and girls.

BROTHERHOOD & HARDINGHAM, 53 and 56, Compton Street, Goswell Road, London.—Patent paragon steam pump, erected for supplying Messrs. Cater and Walker's steam boiler of 50 horse-power. This pump, capable of delivering 1,200 gallons per hour, consists of a steam cylinder 5¼ inches diameter, placed on the top of a hollow column which contains the pump. The chief peculiarity of the steam engine is, that the working parts are enclosed and protected from injury, the crank working in a bonnet on the upper cover of the cylinder, and the connecting rod being coupled direct to the piston. The pressure keeping the crank disc against the inner face of the bearing prevents the escape of steam, thus dispensing with the use of stuffing boxes and reducing friction. The pump is of the bucket and plunger class, with all the working parts of best gun-metal, the plunger being worked by a steel rod attached to the piston and passing through the lower cylinder cover. On the up stroke of the plunger the full contents of the pump barrel

is drawn in and half of it delivered, the remaining half being delivered on the down stroke of the ram, the pump is thus double acting and produces a constant stream. Paragon 3-cylinder engine (Brotherhood's patent), of 35 horse-power, supplied for driving a section of shafting; the special advantages of this engine are, that it will start in any position, there being no "dead centre," and that a perfectly uniform motion of the crank shaft is obtained, without the use of a fly-wheel; no wire-drawing of steam takes place before acting on the pistons, and the connecting rods being always in tension there is no blow or back-lash on the crank pin at either end of the stroke, no matter how loose the fit may be, or at what speed the engine may be running; perfect self-adjustment for wear is maintained in the crank shaft and rotary side valve, the pressure always insuring a steam-tight joint. All stuffing boxes are dispensed with, the working parts are entirely enclosed and protected from injury, and the lubrication is carried by the steam to every part; very high speeds may be attained and great power thereby developed in proportion to the small size of the engine; that exhibited had three cylinders, 9 inches diameter and 8 inches stroke, and running at 225 revolutions per minute with a mean steam pressure of 40 lbs. per square inch, developed a power of 35 horse-power.

Brown Brothers & Company, Rosebank Iron Works, Edinburgh.—Patent steam pump for feeding boilers and raising water for other purposes.

Burney & Company, Tank Factory, Millwall Docks, London.—Wrought iron tank, for water, as used in the British Navy; galvanized iron tank, mostly used for holding spirit; painted wrought iron cistern, for factory, house, or farm purposes; galvanized iron cistern; cattle drinking trough, with Burney's safety edge.

Cater & Walker, Grove Steam Boiler Works, Southwark, London.—Steam boiler of 50 horse-power.

Clark & Company, Rathbone Place, Oxford Street, London, and 8, Kärnthnerstrasse, Vienna.—Patent self-coiling shutters in one sheet of steel; self-coiling wood shutters lined with steel bands; Louvre Venetian shutters.

Coalbrookdale Company, Coalbrookdale, Shropshire.—Grand entrance in mediæval style, consisting of a pair of wrought iron gates, two hand gates, four pillars, and short lengths of railing to match, executed from designs by B. J. Talbert, Esq., with enrichments of cast iron, applied, and twisted bars produced by Tuddenham's patent process; and the two lengths of wrought and cast railing on either side. (The above enclosed the space between the two north entrances to the British section.) The gates, railings, gas pillars, &c., enclosing the house of the Royal British Commission, viz.:—The principal entrance of cast sheet fence and gates, terminated by two gas pillars; the two lengths improved cast palisade fence on either side; a length of cast sheet balcony railing on east side; the west entrance to the building, of patent twisted angle bar fence and gates; a length of the same fence of various designs, on west and north sides; a length of bracket railing, on east side within the grounds. Various coats of arms and trophies in and about the house of Royal British Commission. Garden chairs in grounds and park:—Osmunda regalis, water plant, mediæval, Midsummer's Night's Dream, nasturtium, horse chestnut, and medallion. Vases in grounds and park:—Milton, Night and Morning, classic, and Jardinière. Flower stands in grounds and park.

Collings & Wallis, King Edward's Road, Birmingham.—Portable smith's forge for use in erecting iron work, &c.

Cooke, Sons, & Law, 12, Friday Street, London.—Mats in British section of Industrial Palace, Agricultural Hall, and Machinery Hall, and matting for the office of the Royal Commission and Fine Art Galleries.

Cooke, T., & Sons, Buckingham Works, York.—Clocks for machinery hall, and workmen's houses.

Cooper & Holt, 48, 49, 50, Bunhill Row, London.—Two mahogany dwarf bookcases, the mouldings and inlays of ebony, the centre doors decorated with hand-painted medallions; a 12 feet by 4 feet 6 inches mahogany telescope dining table with patent screw; five 4 feet 6 inches mahogany writing tables, the top covered with green morocco and gilt edgings; mahogany settee, stuffed with best horse hair and springs, and covered with hard-grain

green morocco; easy chairs; chairs; patent reversible billiard table, of polished walnut with black mouldings, and adjusting feet, with slate bed and india-rubber cushions, covered with best cloth, and brass, cues, rest, ivory balls, tips, cue stand, brush marking board, green holland cover, and a book on billiards; polished walnut settee, stuffed with horse hair and springs, and covered in green Persian cretonne; two polished walnut couches and easy chairs; twelve stuffed-back chairs; two Amboyna occasional tables; and two chess top tables; polished oak and black registered writing table and desk chair; stuffed-back chair, in brown leather; inlaid embossed dwarf bookcase, with Ormolu mouldings; polished mahogany pedestal writing table, with leather top; bookcase, with glass doors; polished mahogany cylinder writing table; and stuffed-back chairs, in maroon worsted rep.

COPESTAKE, MOORE, CRAMPTON, & COMPANY, Nottingham and Bow Churchyard, London.—Thirty-six pairs of Nottingham lace curtains, in the Prince's room, public room, ante room, and secretary's room.

DENNIS, W., & COMPANY, 19, Holborn, London.—Patent pneumatic fire extinguishers, and garden irrigators.

DERHAM, JOHN J., Blackburn.—Horizontal non-condensing expansion steam engine of 20 nominal horse power, for driving printing machinery, cylinder 16 inches in diameter, and 3 feet stroke, steam jacketed cylinder, adjustable expansion valves, &c. Horizontal non-condensing expansion steam engine of 25 nominal horse power, for driving wood-working machinery, cylinder 18 inches diameter, and 3 feet stroke; steam jacketed cylinder, fitted with patent expansion "cut-off" valves," and motion for maintaining a uniform speed of engine under the extreme variations of load, dispensing with throttle valve, and ensuring the full boiler pressure of steam on piston at the beginning of stroke, thus working with the greatest economy of fuel. The engines have balanced cranks, large wearing surfaces, all parts easily accessible and adjustable, improved metallic piston, steel piston rods, crank pins, &c., and are mounted upon strong cast-iron foundation frames, planed for receiving the usual parts.

EDGINGTON, JOHN, & COMPANY, 48, Long Lane, Smithfield, London.—Improved marquee hospital, 40 feet by 20, of double white canvas; improved campaigning tents, 10 feet by 7, of white canvas; patent lawn tent, of striped material, requiring no lines, ropes, or separate poles.

ELKINGTON & COMPANY, Newhall Street, Birmingham.—A kettle-drum silver gilt tea service, consisting of coffee and tea pot, sugar basin, cream ewer, silver waiters, tea spoons, sugar tongs, tea cups and saucers. A luncheon tray with decanters, buiscuit box and wine glasses, soda water stand, decanter and glasses. A bronze statuette of Her Majesty the Queen; bronze statuettes of their Royal Highnesses the Prince and Princess of Wales. Four 7-light candelabra; two 2-light branches; twelve gilt candlesticks.

FEETHAM, M., & COMPANY, 9, Clifford Street, Bond Street, London, W.—Bright ventilating warming grate for fire-place in H.R.H. the Prince of Wales' room; bright ventilating warm-air grate, combined with a mantel piece for fire-place in the Exhibitors' club room; two Feetham's circular camp cooking stoves for kitchens in workmen's dwellings; grill stove for cooking chops and steaks.

FIELD, J. C. & J., Upper Marsh, Lambeth, London.—Candles and soap.

FOX, J. CAVEN, Royal Horticultural Gardens, South Kensington, London.—Rustic summer house.

GALLOWAY, W. & J., & SONS, Knott Mill Iron Works, Manchester.—Pair of compound high and low pressure engines to indicate 100 horse-power, designed specially to secure economy in fuel and simplicity of construction. The whole of the engines self-contained, and the governor, by being placed in direct communication with the slide valve for the admission of steam into the high-pressure cylinder, does away with the necessity of a throttle valve, and thus gets the full pressure of steam effectually upon the piston. The exhaust valves for both high and low-pressure cylinders are worked off separate eccentrics, and the air pump is placed horizontally in rear of the engine, and is of simple construction, so as to enable the engine to be run at very high rates of speed if required. Two patent Galloway boilers, each of 50-horse power, and each capable of giving off sufficient steam to drive about 200 indicated horse-power, suitable for an ordinary working pressure of five atmospheres. The

especial feature of these boilers consists of the "Galloway" tubes, which are largely introduced into the flues, the boiler being formed in the front similar to a plain two-flued boiler, but immediately in rear of the fire-bars, these two furnaces united into an oval black flue, in which are placed 24 "Galloway" tubes and four side pockets. These tubes cause a rapid circulation of water, and prevent, in a great measure, the wear and tear which always takes place in a two-flued boiler where there is so great a difference in temperature in the water above and below the flues. This form of boiler is being rapidly introduced into England, about 4,000 of them being now working. The "Gallo- " way" tubes are also largely applied to the ordinary Cornish and two-flued boilers, as they have the advantage of strengthening the flues, improving the circulation, and increasing the power of the boiler. These boilers have been found, from careful experiment, to evaporate upwards of 10 lbs. of water per lb. of coal, the water having been let in at 60 degrees temperature.

HEMBRY, B., & COMPANY, 91, Newgate Street, London.—Linoleum floor cloth and cement.

HEMMING, S. C., & COMPANY, 25, Moorgate Street, London.—Iron buildings, namely, two workmen's houses; Royal Commission pavilion, and offices of British Commission, and a club room.

HILL & SMITH, Brierley Hill Iron Works, Brierley Hill, Staffordshire.—Ornamental iron railings and gates for one of the open courts, and wire fencing for workmen's houses.

HOBBS, HART & COMPANY, 76, Cheapside, London.—Fire-proof safes.

HOWARD, J. & F., Britannia Works, Bedford.—Safety steam boiler of 30 horse-power.

HUDSPITH, WILLIAM, South Tyne Works, Haltwhistle, Northumberland.—Tazzi, for arboretums; fern and floral arboretums; and garden border tiles.

JACKSON & GRAHAM, 29, 33, 34, 35, 37, and 38, Oxford Street, London, W. —Furniture in the Royal Commissioners' Pavilion.—Three pile carpets and borders, designed by Mr. Owen Jones, architect. Three pile carpets and borders, designed by Mr. C. Berger. Three fine patent Axminster carpets, designed by Mr. Owen Jones. Ebony cabinet, inlaid with box, purple, orange wood, &c.; wardrobe of Tuya wood, inlaid with lemon, purple, and black; 5 feet 6 inches brass bedstead, designed by Mr. Owen Jones Ebony cabinet, inlaid with ivory, and engraved; cabinet of Tuya wood, inlaid with ivory, box and other woods, and engraved; vitrine of figured ebony, inlaid; oval Amboyna table, inlaid and engraved; figured ebony writing table, inlaid; Amboyna cabinet, inlaid and mounted with marble; Amboyna cabinet, inlaid and engraved; sideboard of olive, walnut, and black, inlaid with red wood, designed by Mr. A. Losmier. Ebony and ivory secretaire; cabinet, with plaques of porcelain; olive wood cabinet, inlaid; olive wood table, inlaid, designed by Mr. E. Prignot. Hall chairs of walnut, inlaid with ebony; satin wood table, inlaid; octagon table of figured ebony, inlaid; table cabinet of figured ebony, inlaid; oblong Amboyna table, inlaid; octagon Amboyna table, inlaid; small brass bedstead; suite of bed-room furniture, oak inlaid, designed by Mr. C. Berger.

JACOBY, MORITZ, & COMPANY, Stoney Street, Nottingham.—Muslin curtains for decoration of British section.

JENNINGS, G., & COMPANY, Lambeth, London.—Sanitary arrangements, lavatories, &c., for offices and workmen's houses.

KENT, G., 199, 200, 201, High Holborn, London.—Rotary knife cleaners, ventilated refrigerators, bread slicing machines, egg beaters, cinder sifting machines, and various other domestic labour-saving appliances for the workmen's houses.

KENT, G. B., & COMPANY, 11, Great Marlborough Street, London.—Brushes and combs.

LAWRENCE, W., & COMPANY, 14, St. Mary Axe, London.—Refrigerators, water purifiers, &c.

LEWIS, JOHN, India Buildings, Halifax.—Paintings in H.R.H. the Prince of Wales' room. Royal Wilton carpet of special design, in the same room and offices adjoining; Brussels carpet of Oriental design, in the exhibitors' room and adjoining offices; Royal Wilton carpet, conventional flowers, in Rotunda.

D

LLOYD, EDWIN, Horticultural Works, Grantham.—Conservatory of a new mode of construction recently patented by the exhibitor. A wood sill forms the base of the building, and may be either secured by bolts and nuts to wood sleepers, or on a concrete bed in which the bolts are imbedded. The rafters are about six feet apart, and are constructed of two flitches of wrought iron, with a flitch of wood between, well bolted together, the iron on each side being slightly raised above the wood to form a channel for the water, there being no coping used to cover the meeting styles of the sashes. The rafters and mullions are formed in one piece, the ends of the mullions being flanged at the ends, and bolted to the sills, and the ends of the rafters secured in a similar manner, with this difference, that both ends of the rafters meet together at the apex of the roof, and are bolted together through the ridge. The ends are constructed of extra strength, so as to require no framework, and the whole of the building is strongly braced together by light round wrought-iron rods passed through the rafters and end framing, and through lengths of wrought-iron tubing fitted between the rafters; the rods have threads at one end, with washers and nuts, by which the whole building is strained tightly together, and rendered rigid by the iron tubing. The sashes are all grooved, and the glass fixed without putty in a manner recently patented by the manufacturer. A moveable wood slip is fixed on the bottom rail of each sash, by which the lower end of each square of glass is secured from slipping, and protected from breakage. The gutters are of east iron, and secured by bolts and nuts to the gutter plate and upright mullions, the down pipes from the gutter forming a column at each corner of the building; the ridge has ornamental cresting in cast-iron, and at each end is fixed an ornamental wrought-iron finial. The ends have a moulded coping and facia, and a projecting corbel at the eaves, concealing the end of the gutters. The building is so portable and simple in construction, that two men of ordinary capacity can fix and glaze it ready for use in a week.

MERRYWEATHER & SONS, 63, Long Acre, London.—Steam and manual fire-engines, including such as are used by the London Fire Brigade, &c.

MILNER, T., & SON, Phœnix Works, Liverpool.—First class, extra strong, holdfast and fire-resisting safe, "Milner's patent," with drawers. Door 1¼ inches thick, formed of 2½-inch wrought iron plates with ¼-inch hardened steel between them. Body of safe constructed throughout of ½-inch and ¼-inch wrought iron, with ¼-inch of hardened steel between them, making 1 inch in thickness, bolted together with hardened steel bolts, and lined throughout with double, treble, or quadruple chambers, 3, 4½, or 6 inches in thickness.

MINTON, HOLLINS, & COMPANY, Stoke-upon-Trent.—Encaustic paving tiles for verandah of Royal Commissioners' house.

MINTONS, Stoke-upon-Trent.—Jardinières, garden seats, &c.

PATENT IMPROVED FIRE EXTINGUISHER COMPANY, 19, Holborn, London.—Smith and Langley's Patent Steam Sentinel.

PATENT GAS COMPANY (LIMITED), 25, Fenchurch Street, London.—Complete apparatus for manufacturing gas by Dr. Eveleigh's patent process, which consists in distilling coal at a comparatively low temperature, by which a considerable quantity of gas of a superior quality is produced, and also a certain proportion of rich oily matter. This oily matter is then distilled by a secondary process, and a further quantity of gas produced, which is afterwards mixed with that resulting from the first distillation. The practical advantages that are claimed for this over the ordinary process are the following:—1st. A larger quantity of gas is obtained per ton of coal; 2nd. A much higher illuminating power is obtained without the use of cannel; 3rd. Greater purity of gas; 4th. An increased quantity of coke of better quality; 5th. No tar is left as a residue, but instead, a proportionate quantity of pitch.

PAVY'S PATENT FELTED FABRIC COMPANY (LIMITED), 14, Hamsell Street, Falcon Square, London.—Wall decorations and window draperies in exhibitors' room, corridor, and jury room (large corner pavilion).

PERKINS, B., & SONS, 141, Cannon Street, London.—Self-heating gas bath and fittings, japanned and marbled, sienna and rouge royal.

PILLISCHER, M., 88, New Bond Street, London.—Two 4-light silver-plated table lamps, two 2-light silver-plated table lamps, two 1-light silver-plated

reading and microscope lamps, and one bronzed; barometrograph and several thermometers.

POWIS, CHARLES, & COMPANY, Cyclops Works, Millwall Pier, and 60, Gracechurch Street, London.—3-ton locomotive steam crane, and 20-horse power steam-engine.

PRICE'S PATENT CANDLE COMPANY (LIMITED), Belmont Works, Battersea, London.—Palmitine and paraffine candles, toilet soaps, and glycerine.

READING IRON WORKS COMPANY (LIMITED), Reading, Berkshire.—Twenty-five horse-power Class A. High-pressure condensed steam engine. The bed is in the form of a massive moulded girder rounded at one end and square at the other. The crank shaft is of forged scrap iron, with the fly wheel keyed to same, and turned on the face so as to act as a driving wheel if required. The bearings throughout are of gun metal, and adjustable, to compensate for wear. The feed pump is worked by an eccentric on the crank shaft, having double valves, trial and suction taps. The governors are connected with a throttle valve which effectually controls the admission and regularity of the steam supply. The cylinder is 17 inches in diameter, and is steam jacketted so as to keep the working steam in the cylinder quite dry, and consequently free from condensation. The piston is metallic, and the rod of steel, the stroke 30 inches. The engine is also furnished with an extra expansion valve, which can be set and altered whilst the engine is running, so as to cut off the steam at any point varying from 1-10th to one-half of the volume necessary to fill the cylinder. The condenser forms an important element in the economical working of this engine, as by its use the back pressure on the piston is relieved, and an increase of power is gained or a saving of fuel effected equal to 20 per cent.

SHAND, MASON, & COMPANY, 75, Upper Ground Street, Blackfriars Road, London.—Patent equilibrium steam fire engine, capable of delivering 1,000 gallons per minute, throwing to a height of 200 feet through a jet of 1⅞ inch diameter, fitted with patent inclined water tube boiler, by which steam is raised to a pressure of 100 lbs. to the square inch, in 6½ to 7 minutes from the time of lighting the fire, the boiler being supplied with cold water, fitted with Giffard injector, feed pump, suction pipe, and hose complete, and constructed to be drawn by horses at great speed. Steam fire engine of the same description, capable of delivering 670 gallons per minute, and of throwing to a height of 185 feet through a jet 1½ inch diameter. These engines are fitted with a set of treble pumps worked direct by a corresponding set of treble steam cylinders, by use of which perfect uniformity is obtained in the flow of water through hose and suction pipes. The use of three steam cylinders, besides securing the above advantages, enables the fly wheel to be dispensed with. Great economy of steam, and consequently of boiler space and fuel, is thus obtained, and the weight of the whole machine is greatly reduced. A patent vertical London brigade steam fire engine, constructed on the same principle as the above, but fitted with one steam and one water cylinder only, will deliver 350 gallons per minute, and throw to a height of 160 feet, through a jet 1⅛ inch diameter. Patent horizontal, steam fire engine, consisting of a strong gun metal pump placed horizontally, and worked direct by a steam cylinder fitted with patent maintaining motion, so that the fly wheel is not required; it has large waterways, and the valves are removed and replaced with the utmost facility, which renders it also well adapted for irrigation purposes. It is fitted with the same description of boilers as the other engine, and is carried on a strong wrought iron frame, and adapted for rapid travelling, and is drawn by a pair of horses. It will deliver 300 gallons per minute, and throw to a height of 150 feet, through a jet 1 inch in diameter. Manual fire-engine of the same construction as those in use by the London Metropolitan Fire Brigade, and also by municipal and volunteer fire brigades in Great Britain, and all parts of the world.

SHARP, STEWART, & COMPANY, Atlas Works, Manchester.—Improved Giffard injector, 12 inch, of brass throughout, adapted for feeding a range of boilers and for working with any steam pressure; the injector is capable of drawing the feed-water from a depth of six feet, with steam pressure under 50 lbs.; it will work with feed-water heated to 130° Fahrenheit.

SILICATED CARBON FILTER COMPANY, Church Row, Battersea, London.—Two silicated carbon main service filters; two silicated carbon dining-room

filters; two large silicated carbon dining-room filters; two large domestic filters.

SIMON, MAY & COMPANY, Nottingham.—Lace curtains, in a variety of widths, styles, and designs.

SIMPSON, W. B. & SONS, 456, West Strand, London.—Art tile chimney piece for Her Majesty's Commissioners' Office; the chimney piece is of American walnut wood and marble, with upper and lower shelves and clock bracket, projecting side shelves, supported by turned columns, a bevelled mirror above the lower shelf; the panels filled with art tiles, fable subjects, painted in deep blue relieved with yellow, the chimney linings of art tiles; encaustic tile hearth, arranged for open grate and marble fender. Designed and executed by W. B. Simpson & Sons.

SPICE, R. P., C.E., 21, Parliament Street, Westminster, London.—Gas making apparatus and fittings.

SUTTON & SONS, Reading, Berkshire (Queen's Seedsmen).—Grass seeds, for sowing the lawns and the greater part of the Prater. Flower seeds and gladiola—a choice assortment, specially prepared by Messrs. Sutton for planting round the Prince of Wales's pavilion. Vegetable seeds—a large assortment, especially prepared for sowing in the gardens adjoining the workmen's houses, belonging to the Royal British Commission.

TALL & COMPANY (Limited), 8, Lawson Street, Great Dover Street, London.—Labourer's cottage in concrete.

TANGYE, BROTHERS, & HOLMAN, 10, Lawrence Pountney Lane, London.—Hydraulic lifting jacks, pulley blocks, &c.

TEMPLETON, JAS., & COMPANY, Glasgow and London.—Curtains for decorations of industrial buildings.

TYLER, HAYWARD, & COMPANY, Upper Whitecross Street, London.—Independent steam pumping engine, consisting of a steam engine 5 inches in diameter, and double acting pump, the plunger of which is 3 inches in diameter. The motion is communicated from one to the other by a piston-rod, to one end of which is attached the steam piston, and to the other the pump plunger. It works independently of all other machinery, only requiring to be connected with the steam pipe to set it in motion. The steam engine is remarkable for its simplicity. The piston is long and hollow, containing a cylindrical slide-valve, by which the distribution of the steam to the two ends of the cylinder is effected. The piston and slide valve are the only moving parts of the engine. The piston passes at each end of its stroke over steam and exhaust ports in the sides of the cylinder by which the steam enters, and causes the slide valve to move into the position in which the steam supply and the exhaust of the piston are reversed. Both the main piston and the slide valve are thoroughly cushioned with steam at the end of their travel, so that the machine works without the concussion of any parts, and the positions of the valve faces are so arranged that the longer the engine works the more perfectly do they fit. The engine has no dead points, for in whatever direction the piston may be moving, it is evident that it will continue to move until it has passed over the ports which reverse the slide valve. As soon as this is the case the motion of the piston is absolutely reversed, by which we mean that the slide valve cannot alter its position until the piston reaches the other end of the stroke. The pump is double-acting. The valves are so arranged that by undoing four bolts, and removing the air vessel, they are all exposed to view without interfering with any of the pipes. In the middle of the barrel of the pump is a gland entirely separating the two ends of the barrel, and provided with arrangements for being easily tightened up when the end cover of the pump is removed. Through this gland works the plunger of the pump, each end of the plunger working in its own half of the barrel as a single acting plunger; thus the pump consists of two single acting plunger pumps. The object of this arrangement in preference to the ordinary piston working in a bored barrel is that the plunger is much less liable to be worn through the presence of impurity in the water than the piston, and in case of its requiring to be tightened the gland can be readily tightened up by only removing the end cover of the pump. No parts are liable to wear but the plunger and gland, which can be removed without interfering with the body of the pump. These pumps are applied to many purposes, but for boiler feeding they possess im-

portant advantages. The motion being dependent solely on the action of the steam on the piston, they have no dead point, so that the engine runs very slowly. The speed regulates itself according to the work it has to do. The engine if stopped either by want of steam, or by the exit of water being closed, starts of itself as soon as the obstacle is removed. The pump may therefore be made self-acting, dependent on a float arrangement, and will keep the water to a uniform height in the boilers.

UNITE, JOHN, 291, Edgware Road, London, W.—Two best white duck marquees, 30 feet by 15 feet, waterproof, one used by Her Majesty's British Commissioners as a workmen's refreshment tent; square garden tent, eight feet by eight feet, no centre-pole, and easily erected, thoroughly waterproof; Alpine tent, six feet square, weight 20 lb., very portable and waterproof; emigrant's tent, six feet square, waterproof; military camp tent, 36 feet circumference, waterproof and durable.

WARNER, JOHN, & SONS, 8, Crescent, Cripplegate, London.—Three garden engines, with lawn spreaders; three water barrows, with lawn spreaders.

WINFIELD, R. W., & COMPANY, Cambridge Street Works and Rolling Mills, Birmingham.—A handsome massive Egyptian Sphinx Chandelier, with five lights and four brackets to match, with richly ornamented glasses complete, for the appartments specially prepared for His Royal Highness the Prince of Wales, K.G., President; large mediæval chandelier with nine lights and trefoil burners projecting from each arm, for the exhibitors' meeting room; chandelier, with five lights, and table stand, for the secretary's office; two massive billiard pendants, with six lights each, for the smoking room; three-light chandelier, for the ante-room; two large two-light pendants, for the clerks' offices; hexagon lamp, with swing bottom for convenience of lighting, for the entrance hall; lamp for the vestibule, and brackets for the passages, &c., and sundry other chandeliers and brackets for the artisans' dwelling houses; 14 large chandeliers in the nave and rotunda, consisting of five, six, seven, and eight lights.

WOODBURY PERMANENT PRINTING PROCESS COMPANY, 9A, Hereford Square, Brompton.—Frames of permanent photographs for decorating the British workmen's houses.

MESSRS. THOMAS COOK AND SON made arrangements with the various railway companies between London and Vienna which proved in every respect satisfactory.

Messrs. Cook were successful in obtaining exceptional facilities for British exhibitors and their agents, who were enabled to travel, by the tickets supplied to the office of the Commission by this firm, to and from Vienna at less than half the usual single fare (*see* details given on pages 91–94 of this volume).

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Adams, R., 31, Strutton Ground, Westminster	XIII.
Adams, W. Marsham, 3, Pennistone Street, Shepherd's Bush Green, London	XIV.
Adamson, D., and Co., Engineering Works, Hyde Junction, near Manchester	XIII.
Ahrens, Bernhard, 24, Ludgate Hill, London	XIV.
Ainsworth, T., Cleator, Carnforth	V.
Aire and Calder Glass Bottle Company, (E. Breffit), Castleford, Yorkshire	IX.
Aitchison, James, 23, Princes Street, Edinburgh	VII.
Alexander, R., 23, St. James's Square, Edinburgh	III. & IV.
Andradé, de Costa and Co., 7, Cripplegate, London	V., & Add. Exs.
Anglo-Bavarian Brewery Company, Shepton Mallett, Somersetshire	IV.
Appleby, Brothers, Emerson Street, Southwark, London	XIII.
Appleyard, Henry, 36, Lower Sackville Street, Dublin	V.
Archer, John Knight, Liverpool	II., & Add. Exs.
Armitage, Dr., British and Foreign Blind Association	XXVI.
Armitage, Sir Elkanah, and Sons, 48, Moseley Street, Manchester	V.
Armstrong, Sir W. G., and Co., Elswick Works, Newcastle-on-Tyne	XIII., XVI. & XVII.
Ash, C., and Sons, 7, 8, and 9, Broad Street, Golden Square, London	XIV.
Ashton and Co., 45, Chorlton Street, Manchester	V.
Ashworth, E., and Sons, Egerton Mills, Bolton	V.
Atkins, Charles, and Co., 1, Water Lane, Great Tower Street, London	XV.
Atkins, F. H., and Co., 62, Fleet Street, London	XVI.
Atkinson, J. and E., 24, Old Bond Street, London	III. & X.
Atkinson, R., and Co., 31, College Green, Dublin	V.
Augener and Co., 86, Newgate Street, London	XII.
Aveling and Porter, Rochester, and 72, Cannon Street, London	XIII., XIIIA. & XVIII.
Avery, W., and Sons, Redditch, Worcestershire	VII.
Bacon, G. W., 127, Strand, London	XIII.
Baildon, H. C., 73, Princes Street, Edinburgh	III., & Add. Exs.
Baines, William, Railway Plant Works, Birmingham	XVIII.
Baines, W. N., 78, Lancefield Street, Glasgow	XIII.
Baker, J., Falcon Works, Wisbeach, Cambridgeshire	XIIIA.
Baker, T., Whitewall Ironworks, Compton, Berks.	XIIIA.
Baldwin, E. P. and W., Wilden Works, near Stourport	VII.
Bamlett, A. C., Thirsk, Yorkshire	XIIIA
Banner, Samuel, 4, Fazakerley Street, Liverpool	III., & Add. Exs.
Barbour, W., and Sons, Hilden Flax Mills, Lisburn, Ireland	V.
Barford and Perkins, Queen Street Ironworks, Peterborough	XIIIA.
Barlow, Thomas, Loughton, Staffordshire	IX.
Barnard, Bradly, 107, St. Paul's Road, Highbury, London	VIII.
Barnard, Bishop and Barnards, Norfolk Ironworks, Norwich	VII. & XIII.
Barnard, William, Sawbridgeworth, Hertfordshire	IV.
Baruchson, Arnold, and Co., London, Liverpool, and Greenock	IV. & Add. Exs.
Barraclough, T., 10, St. James's Square, Manchester	XIII.
Barrow Flax and Jute Company (Limited), Barrow-in-Furness, Lancashire	V.

* The catalogue of which this (pages 30 to 66) is an extract was prepared with great promptitude and accuracy by Messrs. J. M. Johnson and Sons, Castle Street, Holborn.

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Blews, W., and Sons, 9 to 15, and 38 to 41, New Bartholomew Street, Birmingham	VII. & XV.
Blezard, James, and Sons, Padiham, Lancashire	XIII. & XXVI.
Bliss, W., and Son, Chipping Norton, Oxford	V.
Boase, Miss, Drummond Place, Edinburgh	XXVI
Boby, Robt., St. Andrew's Works, Bury St. Edmunds	XIIIA.
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Clark and Co., Rathbone Place, Oxford Street, London, and 8, Kärnthnerstrasse, Vienna	VII.
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Clarke and Dunham, 48, Mark Lane, London	XIIIA.
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Clarke, J. R., 5, Liverpool Street, Walworth, London	VIII.
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Clarkson Brothers, Glasgow. See J. McNicol, Group XIII.	XIII.
Clayton, Son, and Howlett, Atlas Works, Woodfield Road, Harrow Road, London	II.

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Constable, W. H., Cambridge Stained Glass Works, Cambridge	XXIII.
Convict Prisons in England, Directors of	IX. & XXII.
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Cooke, Sons, and Law, 12, Friday Street, London	V.
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Copestake, Moore, Crampton and Co., Bow Churchyard, London. [Rotunda.]	V.
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Cornelissen and Talle, 22, Great Queen Street, Lincoln's Inn Fields, London	III.
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Cremer, W. H., 210, Regent Street, London	X.
Critchley, Brinsley, and Co., Macclesfield	V.
Croggon and Co., 10, Upper Thames Street, London	VII.
Cropper, H. S., and Co., Hockley Mill, Nottingham	XIII.
Crosse and Blackwell, 21, Soho Square, London	IV.
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Croy, Andrew, 58, North Hanover Street, Glasgow	III.
Cumberland, R., 3, Rue Scribe, Paris	V.
Cunningham, J. and J., 102, West Bow, Edinburgh	II., & Add. Exs.
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Cwmorthin Slate Company (Limited), Port-Madoc, North Wales	IX.
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Daniell, A. B., and Son, 46, Wigmore Street, London	IX.
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Davis and Primrose, 68, Duke Street, Leith	XIII.
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Denny, W., and Bros., Dumbarton. [Rotunda.]	XVII.
Dennis and Co., 19, Holborn, London	XIII.
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Dinneford and Co., 172, New Bond Street, London	III. & V.
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Donkin, B., & Co., Bermondsey, Dondon	XIII.
Dougall, Jas. D., 59, St. James's Street, London	VII.
Doulton, H., and Co., Lambeth Pottery, London	VII., IX., & XVIII.
Doulton and Watts, 28, High Street, Lambeth, London	IX.
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Drew, John, 33, Regent Street, London	VI. & VIII.
Dudgeon, A., 22, Great George Street, Westminster, London	XIII.
Duncan, Flockhart, and Co., 52, North Bridge, Edinburgh	III.
Duncan, Jno., 6, George Street, Great Portland Street, London	VIII.
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Edinburgh Ropery Company, Leith	II., & Add. Exs.
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Elkington & Co., Newhall Street, Birmingham	VII.
Ellam, Benjamin, 213, Piccadilly, London	VI.
Ellis, William, Pimlico Wharf, London	XIII.
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Engert and Rolfe, Barchester Street, Poplar New Town, London	V.
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French and Co., 9, Royal Exchange, London	XIV.
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Gillow and Co., 176, Oxford Street, London. [Rotunda.]	VIII.
Gilroy, Brothers, and Co., Dundee	II., & Add. Exs.
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Gwynne and Co., Essex Street Works, Strand, London	XIII.
Haddon and Co., See Cohné, S.	III.
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Hancocks and Co., 38 and 39, Bruton Street, London	VII.
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Hemingway, S., and Co., Trafalgar Street, Bradford, Yorkshire	III. & IV.
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Henderson and Co., Durham	V.
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Hewitson and Co., 17, Harp Lane, Great Tower Street, London	IV.
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Hill and Smith, Brierley Hill Ironworks, Brierley Hill, Staffordshire	VII. & XIII.
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Holland and Co., Onslow House, Fulham Road, London	XIII.
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Holmes and Taylor, 12, Buckingham Street, Strand, London	XIII.
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Huxhams and Brown, Commercial Road, Exeter	VI. & XIII.
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Johnson, Richard, Clapham and Morris, 27, Dale Street, Manchester	VII.
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Lee, H.N. and E., 27, Watling Street and 138, High Holborn, London	VI.
Lee, James Abraham, Severn Ironworks, Lydney, Gloucester	XI.
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Leighton, John, F.S.A., 12, Ormonde Terrace, Regent's Park, London	XII.
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Lempart, Maurice, 150, Leadenhall Street, London, and Sheffield	VII.
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Lester, C. & T., High Street, Bedford	V.
Leveson, Major, 22, King Street, Covent Garden, London	XVI.
Lewin, Stephen, Poole, Dorset	XIIIA.
Lewis, Abel, Douglas, Isle of Man	XII.
Lewis, E. W., 4, Sherwood Crescent, Upper Westbourne Park, London	X.
Lewis and Co., Salopian Ironworks, Shrewsbury	XIIIA.
Lewis, Jno., India Buildings, Halifax	V.
Lewis, Geo. E., 32 & 33, Lower Loveday Street, Birmingham	VII. & XVI.
Lewis and Peat, 11, Mincing Lane, London	II., III., & Add. Exs.
Lichtsheindl and Co., 10, Upper Weymouth Street, London	V. & VII.
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Lobb, Jno., 296, Regent Street, London	V.
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Losada, J. R., 105, Regent Street, London	XIV.
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Lovey, Edward, Ponsnooth, Perran-ar-worthal, Cornwall	II.
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Lyons, William, Park Street, Manchester	XI.
Lyle, Jno., and Co., 10, Forneuk Street, Glasgow	V.
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Macdaniel, C., and Co., 343, Oxford Street, London	VII.
Macfarlane, W. and Co., Saracen Foundry, Glasgow	VII.
Mander, Brothers, Varnish Works, Wolverhampton	III.
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McLachlan, Lachlan, Manchester	XII.
McLean and Hope, Leith, N.B.	XI., & Add. Exs.
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Merryweather and Sons, 63, Long Acre, London	XIII.
Meyers and Davis, 56, Southwark Street, London	II. & Add. Exs.
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Milburn, William, 7, Todd Street, Corporation Street, Manchester	XIII.
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Milward, J. F., 60, Great Hampton Row, Birmingham	VII.
Minier, Nash and Nash, Strand, London	II. & Add. Exs.
Minns, James, Thorn Lane, Norwich	VIII.
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Mintons, Stoke-upon-Trent	IX.
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Mulliner, H., Leamington Spa, Warwickshire	XIII.
Munn, Major W. Augustus, Churchill House, Dover	II.
Murcott, Theophilus, 68, Haymarket, London	VII. & XVI.
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Neave, S., and Sons, 7, Peel Street, Manchester	V.
Neilson, H., 7, Brunswick Street, Liverpool	II., & Add. Exs.
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Nevile, Reid and Co., Windsor, Berkshire	IV.
New, D., and Co., Moscow Works, Nottingham	XIII.
Newcastle Chemical Works Company (Limited), 4, Quay Side, Newcastle-on-Tyne	III.
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Newton, Gough and Co., 26, Blackfriars Street, Manchester	VI. & XIII.
Newton, Keats, and Co., 28, King Street, Liverpool	I., & Add. Exs.
Nicholson, J. O., Macclesfield	V.
Nicholson, W. N., and Son, Trent Iron Works, Newark	XIIIA.
Nicoll, D., and Co., 58 and 59, Paternoster Row, London	III. & V.
Norman, S. W., 116, Westminster Bridge Road, London	V. & XIII.
Norris, S.E., and Co., High Street, Shadwell, London	XIII.
North British Rubber Company (Limited), Castle Mills, Fountain Bridge, Edinburgh	VI.
Nussey and Pilling, Park Works, Park Lane, Leeds	XIII.
Oclee, Frederick H., 31, New Bailey Street, Salford	XIV.
Ogden, Thomas, and Co., Werneth Iron Works Mill, Oldham	V.
Ormerod, Miss Eleanor, Sedbury Park, Chepstow	II.
Packard, E., and Co., Ipswich, Suffolk	II.
Page, E., and Co., Victoria Ironworks, Bedford	XIII. & XIIIA.
Palmer's Shipbuilding Company (Limited), Jarrow-on-Tyne. [Rotunda.]	XVII.
Parkington, J. R., and Co., 24 Crutched Friars, London	IV.
Parsons, Fletcher and Co., Gravel Lane, Southwark, London	III.
Partridge, and Co., Lombard Street, Birmingham	VII.
Pascall, Atkey, and Son, Cowes, Isle of Wight	VII.
Patent Cork Company, 1, Great Winchester Street Buildings, London	II.
Patent Gas Company (Limited), 25, Fenchurch Street, London	XIII.
Patent Machine Stone Dressing Company (W. Payton, Manager), 21, Great George Street, London	XIII.
Patent Nut and Bolt Company (Limited), London Works, Birmingham	VII.
Patent Plumbago Crucible Company, Battersea Works, London	I., & Add. Exs.
Patent Waterproof Paper and Corrugated Fibre Company, Old Mill, Farnworth, Lancashire	XI.
Patry and Pasteur, 38, Mincing Lane, London	II., & Add. Exs.
Patterson, W., and Sons, Nottingham	V.
Pavy's Patent Felted Fabric Company, 13 to 15, Hamsell Street, Falcon Square, London	V.
Payton, Walter, 21, Great George Street, Westminster, London	XIII.
Peek, Frean and Co., Dockhead, Bermondsey, London	IV.
Peel, Brothers, and Co., Bradford. [Rotunda.]	V.
Peagam, J. J. R., 7, Queen Street, St. Helier's, Jersey	X.
Pearson, F. G., and Co., Hope Works, Furnace Hill, Sheffield	VII.
Pearson, S., and Co., Macclesfield	V.
Pegler, C., Junr., and Co., 58, Briggate, Leeds	V.
Pellatt and Co., Falcon Glass Works, Blackfriars, London	IX.
Pellatt and Wood, 25, Baker Street, London	IX.
Penn, John, and Son, Greenwich	XIII.
Penney and Company (Limited), Lincoln	XIIIA.
Perkins, B., and Sons, Bell Court, 141, Cannon Street, London	VII.
Pen-yr-orsedd Slate Quarry Company (Limited), Carmarvon, North Wales	IX.
Peters and Son, 53, Park Street, Grosvenor Square, London	XIII.
Peyton and Peyton, Bordesley Works, Birmingham	VII.
Phillp, C. J., Birmingham	VII.
Pickering, Jonathan, Stockton-on-Tees	XIII.
Pickering, Joseph, Mowbray Street, Sheffield	III.
Piesse and Lubin, 2, New Bond Street, London. [Rotunda.]	III., & Add. Exs.
Pigall, Franz, 22, Tichborne Street, London	VII.
Pillischer, M., 88, New Bond Street, London. [Rotunda.]	VII. & XIV.

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Pim, Brothers, and Co., William Street, Dublin	V.
Plant, Brothers, 66, Bromsgrove Street, Birmingham	VII.
Platt, Brothers, and Co. (Limited), Hartford Iron Works, Oldham	XIII.
Plunkett, Jno., and Co., Portland Works, Portland Street, Dublin	IV.
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[illegible]delyffe, Dick and Co., 129, High Holborn, London	II.
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[illegible]nsome, A., and Co., 304, King's Road, Chelsea, London	XIII. & XVIII.
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Rein, Mrs. C. F., 108, Strand, London. [Rotunda.]	XIV.
[illegible]ligious Tract Society, 56, Paternoster Row, London	XII.
[illegible]mond and Chandler, Salford, Manchester	XIIIA.
[illegible]rds, Chas. A., Bell Busk Mills, near Leeds	V.
[illegible]el, Eugène, 96, Strand, London. [Rotunda.]	III.
[illegible], J., and Sons, West of England Carriage Works, Bridgewater	XIII.
[illegible]nd Co. (Limited), Perseverance Ironworks, Lincoln	XIIIA.
[illegible] H. P., and Cherrill, N. K., Tunbridge Wells	XII.
[illegible] T., and Son, Railway Works, Rochdale; and 84, Cannon [illegible]ondon	XIII.
[illegible]lery Company (Limited), Camden Town Station, London	IV.
[illegible]and Wilson, 31, Threadneedle Street, London	III., & Add. Exs.
[illegible]oss and Duncan, Abercorn Thread Factory, Abercorn Street, Paisley	V.
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Walker, W., 119, Bunhill Row, London	VIII.

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Wane, Marshall, 4, Finch Road, Douglas, Isle of Man	XII.
Wanzer, R. M., and Co., Hamilton, Canada; see Doubleday, Son and Co.	XIII.
Wanzer Sewing Machine Company, 4, Great Portland Street, London	XIII.
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Ward and Payne, 114, West Street, Sheffield	VII.
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Watson, Bontor, and Co., 35 & 36, Old Bond Street, London	V.
Watts, J., and Co., 6, Broad Weir, Bristol	VII.
Webb and Son, Combs Tannery, Stowmarket	VI. & XIII.
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Wedgwood, Josiah, and Sons, Etruria, Stoke-on-Trent	IX.
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Whitehead, R. R. and Brothers (Limited), 14, Hanover Street, Long Acre, London	V.
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Whitley, Partners, Hunslet Road, Leeds, Yorkshire	XIII.
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Science and Art Department.
Victoria.

BRASS, SHEETS, TUBES, WIRE, CASTINGS, NAILS, SPIKES, BEDSTEADS, &c.
Blews, W., & Sons.
Broughton Copper Company.
Collings & Wallis.
Everitt, A., & Sons.
Lichtscheindl & Co.
New, D., & Co.
Peyton & Peyton.
Schletter & Co.
Whitley Partners.
Winfield, R. W., & Co.

BRICKS, BRICKMAKING, TILES, COPINGS, &c.
Burgh Castle Portland Cement Company.
Derham, T. S.
Doulton, H., & Co.
Page, E., & Co.
Wood & Ivery.

BRITANNIA METAL GOODS.
Broadhead, R., & Co.
Shaw & Fisher.

BRUSHES, COMBS, AND SPONGES.
Brace, H., & Co. (Limited).
Harris, S. & H.
Kent, G. B., & Co.

BRUSHES, &c.—cont.
Schletter & Co.
Stewart & Co.

BUILDING CONSTRUCTION, CIVIL ENGINEERING.
Chadwick, E., C.B.
Croggon & Co.
Dows, Clark & Co.
Fletcher, Lowndes & Co.
Industrial (Improved) Dwellings Company.
Moseley & Fulham.
Redman, J. B.
Reid, B., & Co.
Society for Improving the Condition of the Labouring Classes.
Tall & Co. (Limited).
Twyman, A.

CABLES, ROPES, &c.
Ogden & Co.

CANDLES, MATCHES, &c.
Bryant & May.
Field, J. C., & J.
New Zealand.
Price's Patent Candle Company.
Young's Paraffine, Light, and Mineral Oil Company.

CANDLESTICKS, CANDELABRA, CHANDELIERS, &c.
Best & Lloyd.
Betjemann, G., & Sons.
Blews, W., & Sons.
Collings & Wallis.
Green, James.
Partridge & Co.
Philip, C. J.
Ratcliff & Tyler.
Shaw & Fisher.
Winfield, R. W., & Co.

CARDS, CARD WIRE, AND CARDING MACHINERY.
Bateman, D., & Sons.
Fleming, T., & Son.
Lawson & Sons.
Smith, F., & Co.

CARPETS AND RUGS, AND CARPET DESIGNS.
Battam, Heywood & Hanks.
Brinton, John, & Co.
Clark, Son, & Morland.
Cooke, Sons, & Law.
Gower, Woodward & Co.
Harvey, J.
Henderson & Co.
Hepworth, B., & Son.
Humfries & Sons.
Jackson & Graham.
Lapworth Brothers.
Lewis, John.
Lyle, J., & Co.

CARPETS, &c.—cont.
Mitchell Brothers.
Morton & Sons.
Schletter & Co.
Tapling, Thomas, & Co.
Templeton, James, & Co.
Templeton, J. & J. S.
Tomkinson & Adam.
Watson, Bontor & Co.
Widnell, Henry, & Co.
Wilkinson, J., Son & Co.
Woodward, Grosvenor & Co.

CARRIAGES, PARTS OF CARRIAGES, AND FITTINGS OF CARRIAGES, CARTS, &c.
Coleman & Morton.
Evans, James.
Hazeldine Brothers.
Holland, E., & Co.
Hopton, H., & Son.
Hutton, John, & Sons.
Mulliner, H.
Patent Nut & Bolt Co.
Peters, Thos., & Son.
Roberts, John, & Sons.
Shanks, F. & R.
Streeter, Ed. W.
Thorn, C.
Ward, J.
Windover, C. S.

CEMENTS.
Burgh Castle Portland Cement Company (Limited).
Corcoran, Bryan, Witt & Co.
Johnson, I. C., & Co.
Lavers, A. H.
Mond, Ludwig.
Scott's Sewage Company.
Whitley Partners.
Wouldham Cement Company.

CEMENT TESTING MACHINE.
Johnson, I. C., & Co.

CHAINS, CHAIN CABLES, &c.
Collings & Wallis.
Homes & Hickton.
Martin, Claude.
Walker Forged Screw and Bolt Company.

CHEMICAL & PHARMACEUTICAL PRODUCTS.
Adams, John.
Bell, J., & Co.
British Seaweed Company.
Bush, W. J., & Co.
Calvert, F. C., & Co.
Ceylon.
Cooper, William T.
Dinneford & Co.

CHEMICAL & PHARMACEUTICAL PRODUCTS—cont.
Duncan, Flockhart & Co.
Evans, Lescher & Evans.
Fowler, G. & T.
Hutchinson, J., & Co.
McCombie & Co.
Mond, Ludwig.
Newcastle Chemical Works.
Pickering, Joseph.
Price's Patent Candle Company (Limited).
Runcorn Soap & Alkali Company.
Smith, T. & H., & Co.
Spence, J. Berger, & Co.
Victoria.
Wilkin & Clark.
Wyndham, F., & Co.
Young's Paraffine Oil Company.

CHINA, EARTHENWARE, AND OTHER POTTERY.
Barlow, Thomas,
Broadhead, R., & Co.
Brown-Westhead, Moore & Co.
Boucher, Guy & Co.
Copeland, W. T., & Sons.
Daniell, A. B., & Son.
Doulton, H., & Co.
Doulton & Watts.
Jones, G.
Minton, Hollins & Co.
Mintons.
Mortlock, J.
Pellatt & Wood.
Royal Porcelain Works, Worcester.
Simpson, W. B., & Sons.
Taylor, R. Minton.
Wedgwood, Josiah, & Sons.

CHRONOMETERS, & CLOCK AND WATCH WORK OF ALL KINDS.
Cooke, T., & Sons.
French & Co.
Greenwood, J., & Sons.
Klaftenberger, C. J.
Kullberg, V.
Lozada, J. R.
Sivel & Walter.
Streeter, Ed. W.
Thomas, W.
Weichert, William.

CLOTHING.
Cumberland, Robert.
Hitchcock, Williams & Co.
Jones, Evans & Co.
Jones, Pryce.
Kerr, Scott & Son.
New Zealand.
Simon, May & Co.
Welch, Margetson & Co

COAL.
Cwmaman Coal Company.
Insole, G., & Son.
New Zealand.

COCOA, CHOCOLATE, COFFEE, CHICORY, & THEIR PREPARATIONS.
Brancker, J. B.
Brotchie, R., & Co.
Ceylon.
English Condensed Milk Company.
Fortnum & Mason.
Fry, J. S., & Sons.
How & Barclay.
Yuille, Andrew.

COLOURS, PAINT, DYES, AND STAINS.
Bewicke, D., & Co.
Binko, H. B.
Bush, W. J., & Co.
Calvert, F. C., & Co.
Carson, W., & Sons.
Colman, J. & J.
Cornelissen & Talle.
Denton & Jutsum.
Fleming, A. B., & Co.
Jackson, T. S.
Sanderson, A., & Co.
Smith, T. O.
Stephens, H. C.
Universal Paint Company.

CONDIMENTS, SAUCES, SPICES, FLAVOURINGS, &c.
Alexander, Richard.
Batty & Co.
Borwick, G., & Son.
Bush, W. J., & Co.
Ceylon.
Clarke, G. B.
Colman, J. & J.
Crosse & Blackwell.
Ferguson, Alexander.
Fortnum, Mason & Co.
Goodall, Backhouse & Co.
Henley & Son.
Mackay, Jno.
Yuille, Andrew.

COPPER — SHEET, PLATES, TUBES, INGOTS, BOLTS, NAILS, AND RIVETS.
Broughton Copper Company.
Whitley Partners.
Winfield, R. W., & Co.

CORK.
Patent Cork Company.

CORN MILLS, CORN SCREENS, & CORN DRESSING MACHINERY.
Baker, J.
Baker, T.

CORN MILLS, &c.—cont.
Barford & Perkins.
Boby, R.
Clarke & Dunham.
Coleman & Morton.
Corcoran, Bryan, Witt & Co.
Davey, Paxman & Co.
Garrett & Sons.
Hornsby & Sons.
Houghton, W., & Co.
Hunt & Tawell.
Marshall, Sons & Co. (Limited)
Nalder & Nalder.
Page, E., & Co.
Penney & Co.
Ransomes, Sims & Head.
Reading Iron Works Company (Limited).
Richmond & Chandler.
Robey & Co. (Limited).
Ruston, Proctor & Co.
Turner, E. R. & F.
Woods, Cocksedge & Warner.
Willsher & Co.

CORN DISTRIBUTING MACHINE, & CHONDROMETER.
Armstrong, Sir W. G., & Co.
Corcoran, Bryan, Witt & Co.
Coultas, J.
Smyth, J., & Sons.
Weetman, John.

COTTON, COTTON YARN, COTTON THREAD.
Ashworth, E., & Sons.
Bowman Brothers.
Brook, Jonas, & Brothers.
Carlile, J., Sons & Co.
Ceylon.
Clark & Co.
Clark, J., & Co.
Clarke, I. P., & Co.
Coats, J. & P.
Dewhurst, John, & Sons.
Dickins & Co.
Ermen & Engels.
Evans, Walter, & Co.
Gordon, J., & Co.
Kerr, Price & Co.
Neilson, H.
Ogden, T., & Co.
Ross & Duncan.
Simmonds, P. L.
Stead Brothers.
Waters, J. & E., & Co.

COTTON FABRICS.
Armitage, Sir E., & Sons.
Ashton & Co.
Behrens, Louis.
Copestake, Moore, Crampton & Co.
Corbière, E., & Son.
Dicksons, Ferguson & Co.

COTTON FABRICS—cont.
Hinchcliffe, J. & J.
Horrockses, Miller & Co.
Jacoby, Moritz, & Co.
Johnson, Jabez, & Fildes.
Kesselmeyer, W., & C.
Ogden & Co.
Steiner & Co.
Stretton & Co.
Swainson, Birley & Co.
Warburg & Co.
Welch, Margetson & Co.

COTTON PRINTING MACHINERY, &c.
Barraclough, Thomas.
Broughton Copper Company.
Mather & Platt.
Sumner & Co.

COTTON SEED.
Pols, J. A.

COTTON WORKING MACHINERY.
Bateman, D., & Sons.
Blezard, James, & Co.
Clark & Co.
Irvin & Sellers.
Kerr, Price & Co.
Mather & Platt.
Platt, Brothers & Co. (Limited).

CRANES, (Steam and other).
Appleby Brothers.
Brown, Brothers & Co.
De Lorière, C. E., & Co.
Johnson & Ellington.
Powis, Charles, & Co.
Wilson, John H., & Co.

CRANKS.
Clarke, Edwd.

CRUCIBLES, MELTING POTS, &c.
Doulton, H., & Co.
Hynam, J.

CUTLERY.
Brookes & Crookes.
Collings & Wallis.
Lempart, M.
Macdaniel & Co.
Neal, John.
Pigall, Franz.
Schletter & Co.

DAIRY PRODUCE, BUTTER, CHEESE, DAIRY MACHINES, &c.
Kent, G.
New Zealand.

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Dicksons, Ferguson & Co.
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Pegler, C., Jun., & Co.

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Harvey, J.
Jones, Owen.
Morant, Boyd & Blanford.
Wyon, J. S., & A. B.

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Calvert, F. C., & Co.
Clarke, G. B.
Cohné, S., & Co.
Down, & Co.
Fowler, G. & T.
Watts, John, & Co.

DIVING APPARATUS.
Heinke & Davis.
Siebe & Gorman.

DRESSING CASES, &c.
Betjemann & Sons.
Drew, John.
Goggin, J.

DRILLING MACHINES.
New, D., & Co.
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Whitley Partners.

DRILLING, SCREWING, SLOTTING, SHAPING, AND OTHER TOOL MAKING MACHINES.
De Bergue, C., & Co.
New, D., & Co.
Sharp, Stewart & Co. (Limited).

DRILLS FOR SEED AND MANURE, BROADCAST SOWING MACHINES.
Boby, R.
Corcoran, Bryan, Witt & Co.
Coultas, J.
Edwards, G. B.
Garrett, R., & Sons.
Hornsby & Sons.
Reid, B., & Co.
Smyth, J., & Sons.

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Corcoran, Bryan, Witt & Co.
Edwards, W. J.
Holgate, J., & Co.
Ingham, J., & Son.
Middlemore, W.
Newton, Gough & Co.
Norris, S. E., & Co.
Powis & Co.
Webb & Son.
Whitehead, R. R., & Bros. (Lim.)

DYES, DYE WOOD, &c.
Patry & Pasteur.
Archer, J. K.

EDUCATIONAL BOOKS, &c.
Armitage, Dr.
Blackwood & Sons.
Boase, Miss.
British & Foreign Bible Society.
Havet, Alfred G.
Loth, J. T.
Sunday School Union.
Religious Tract Society.
Rundell, J. B.

ELASTIC FABRICS, AND ELASTIC WEB MACHINERY.
Daft, T. B.
Posselt Peters, & Co.
Simon, May & Co.
Turner, A., & Co.

ELECTRICAL AND ELECTRO-MAGNETIC AND GALVANIC BATTERIES, APPARATUS, LAMPS, &c.
Ahrens, Bernhard.
Heinke & Davis.
Pillischer, M.
Pulvermacher, J. L.
Siemens Bros.
Vavasseur, J., & Co.

ELECTRO-REPRODUCTIONS OF WORKS OF ART, AND ELECTRO-PLATED WARE.
Benham & Sons.
Broadhead & Co.
Elkington & Co.
Franchi, G., & Co.
Science and Art Department.
Shaw & Fisher.

ELEVATORS FOR HAY, STRAW, &c.
Clayton & Shuttleworth.
Coleman & Morton.
Lewin, S.
Robey & Co. (Limited).

ENAMELLED IRON TABLETS.
Grant & Co.
Johnson, J. M., & Sons.

ENGINE COUNTERS, MANOMETERS, INDICATORS, &c.
Dewrance, J., & Co.
Whitley Partners.

ENGRAVING AND ENAMELLING ON GEMS, METALS, GLASS, &c.
Bartholomew, John.
Blades, East & Blades.
Copeland & Sons.
Daniell & Son.
Elkington & Co.

ENGRAVING, &c.—cont.
Morgan, G.
Pellatt & Co.
Royal Porcelain Works (Worcester).
Wyon, J. S., & A. B.

ENGRAVING MACHINERY.
Lockett, Leake & Co.
Sumner, John M., & Co.

FEATHERS, FOR ORNAMENT.
Andradé, M. de Costa, & Co.
Hill, H., & Sons.
Laybourn, W. J.
Ward, Henry.

FELT, AND ARTICLES MADE OF FELT.
Christy, J. E. & W., & Co.
Cooke, Sons, & Law.
Engert & Rolfe.
Mitchell Brothers.
Pavy's Patent Felted Fabric Company (Limited).
Vyse, Sons, & Co.
Whitehead, R. R., & Brothers (Limited).
Wilkinson, J., Son & Co.
Woodhams, Macqueen & Johnson.

FILES AND RASPS.
Collings & Wallis.
Kenyon, John, & Co.
Pearson, F. G., & Co.
Smith, Robert, & Co.
Spear & Jackson.
Whitley Partners.
Wilson-Hawksworth, Ellison & Co.

FILTERS, FILTERING BAGS, &c.
Dows, Clark & Co.
Lawrence, W.
Silicated Carbon Filter Company.
Whitehead, R. R., & Brothers (Limited).

FINE ARTS.

FIRE-ARMS.
Adams & Co. (Limited).
Dougall, J. D.
Henry, Alexander.
Henry Rifle Barrel Company.
Lancaster, H.
Landore Siemens Steel Company.
Lewis, G. E.
Murcott, Theophilus.
Schletter & Co.
Soper, W.
Webley, P., & Son.

FIRE ENGINES AND FIRE EXTINGUISHING APPARATUS, HOSE, BUCKETS, &c.
Blakeborough, Jos.
Dennis & Co.
Gabrielli, A.
Haynes, Thos., & Sons.
Holgate, J., & Co.
Merryweather & Sons.
Norris, S. E., & Co.
Shand, Mason & Co.
Warner, John, & Sons.
Webb & Son.
Whitley Partners.

FIRE PROOF SAFES, FIRE PROOFING.
Chatwood, Samuel.
Hobbs, Hart & Co.
Milner, Thomas, & Son.
Nicoll, D., & Co.

FISH HOOKS, FISHING NETS AND TACKLE.
Jones & Co.
Milward, H., & Sons.
Ogden & Co.
Woodfield, W., & Sons.

FLANNEL.
Jones, Pryce.
Jones, T. & J. H., Evans, & Co.
Newell, T. & J. H.
Willans, Thomas B., & Co.

FLAX, HEMP, JUTE, AND OTHER FIBRES, AND FLAX MACHINERY.
Bahamas.
Barbour, W., & Sons.
Barraclough, T.
Barrow Flax and Jute Company.
Bencke & Sharman.
Ceylon.
Combe & Barbour.
Edinburgh Ropery Company.
Gilroy Brothers.
Jaffé Brothers.
Lawson & Sons.
Mauritius.
Moore & Weinberg.
New Zealand.
Smith, R. M.
Swan Brothers.
Trinidad.

FLOOR CLOTHS AND MATTING.
Cooke, Sons & Law.
Deed, J. S., & Sons.
Harry, W. D., & Co.
Hembry, B., & Co.
Schletter & Co.

FLOUR AND FLOUR MILLS.
Corcoran, Bryan, Witt & Co.
Follows & Bate.
Hubbuck, Jos.
Turner, E. R. & F.
Victoria.

FURNACES, FORGES, AND BLOWING MACHINERY.
Collings & Wallis.
Siemens, C. William.
Thwaites & Carbutt.
Whitwell, Thomas.

FURNITURE AND DECORATIONS, WITH DESIGNS.
Barnard, B.
Barnard, Bishop & Barnards.
Battam, Heywood & Hanks.
Betjemann, George, & Sons.
Clark, J. R.
Clark, W., & Sons.
Clark & Co.
Coalbrookdale Company.
Collinson & Lock.
Cooper & Holt.
Foley, Arthur.
Gillow & Co.
Heal & Son.
Holland & Sons.
Jackson & Graham.
Jacob, Thomas.
Jones, Owen.
Le Cras, J., Jun.
Lichtscheindl & Co.
Morant, Boyd & Blanford.
New Zealand.
Peyton & Peyton.
Walker, W.
Ward, Henry.

FURNITURE AND UPHOLSTERY STUFFS.
Corbière, E., & Son.
Heal & Son.
Pim Brothers.
Scarborough Brothers.

GAMES AND TOYS.
Ahrens, Bernhard.
Binko, H. Bock.
Cremer, W. H.
English, J., & Co.
Lewis, E. W.

GARDEN AND PARK ENGINES, FURNITURE, FITTINGS, AND UTENSILS.
Barnard, Bishop & Barnards.
Brown, J. B., & Co.
Coalbrookdale Company.
Coleman & Morton.
Fox, J. Caven.
Haynes, T., & Sons.
Hudspith, W.

GARDEN ENGINES, &c.—cont.
Lloyd, E.
Peyton & Peyton.
Radclyffe, Dick & Co.
Simon, H., C.E.
Warner, John, & Sons.

GAS APPARATUS, GASOMETERS, METERS, & FITTINGS.
Benham & Sons.
Best & Lloyd.
Blews & Sons.
Brown & Co.
Glover, George, & Co.
Partridge & Co.
Ratcliff & Tyler.
Russell, James, & Sons.
Whitley Partners.
Winfield, R. W., & Co.

GAS-MAKING MACHINERY, AND GAS ENGINES.
Gwynne & Co.
Patent Gas Company (Limited).
Spice, R. P.

GELATINE, ISINGLASS, GLUE, &c.
Green, J.
New Zealand.
Wigan & Co.
Wright, Freeman.

GLASS, AND STAINED GLASS.
Aire & Calder Glass Bottle Company.
Boucher, Guy & Co.
Codd, H.
Constable, W. H.
Copeland, W. T., & Sons.
Daniell, A. B., & Son.
De Morini, Ch.
Green, James.
Moore, E., & Co.
Mortlock, John.
Pellatt & Co.
Pellatt & Wood.

GOLD.
West Africa.

GOLDSMITHS' & SILVERSMITHS' WORK, & PLATED GOODS.
Elkington & Co.
Franchi, G., & Co.
Hancocks & Co.
Leonardt, D., & Co.
New Zealand Government.
Thomas, W. J.

GRINDING & POLISHING WHEELS & MACHINERY.
Corcoran, Bryan, Witt & Co.
Hazeon, P., & Co.
Warne, W., & Co.

GRINDING WHEELS, &c.-cont.
Whitley Partners.
Worssam, Samuel, & Co.

GUMS AND RESINS.
Banner, Samuel.
Blackwood, J., & Co.
Denton & Jutsum.
Lewis & Peat.
Mander Brothers.
Runcorn Soap and Alkali Works.
Sissons, Brothers & Co.
Smith, T. & H., & Co.

HATS AND CAPS, AND THEIR MATERIALS.
Christy, J. E., & W., & Co.
Cumberland, Robert.
Vyse, Sons, & Co.
Woodhams, Macqueen & Johnson.

HAT MAKING MACHINES.
Boby, R.
Howard, J. & F.
Nicholson, W. N., & Son.
Ransomes, Sims & Head.

HOISTING MACHINERY.
Adamson, D., & Co.
Barnard, Bishop & Barnards.
Corcoran, Bryan, Witt & Co.
Head, Wrightson & Co.
Johnson & Ellington.
Payton, W.
Pickering, Jonathan.

HORSE SHOE NAILS, HORSE CLIPPERS, STABLE FITTINGS, &c.
Barnard, Bishop & Barnards.
Clark, William.
Homes & Hickton.
Moser, H., & R. J.
Yates, Haywood & Co.

HORTICULTURAL BUILDINGS.
Lloyd, E.

HOSIERY.
Appleyard, Henry.
Morley, I. & R.
Smyth & Co.

HOSPITALS, AMBULANCES, &c.
Mayo, Dr. C.

HYDRAULIC JACKS, PRESSES, HOISTS, TUBES, AND FITTINGS.
Adamson, Daniel, & Co.
Blews, W., & Sons.
Brown & Co.
Gwynne & Co.
Russell, James, & Sons.
Sibree, P.
Tangye, Brothers & Holman.
Warner, John, & Sons.

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(Collected and arranged by Professor Archer for the Royal Commissioners.)

Andradé, M. de Costa.
Archer, J. K.
Baildon, H. C.
Banner, S.
Baruchson, Arnold & Co.
Bencke & Co.
Bostock & Abington.
Bowes, J. L., & Brother.
Brancker, J. B.
Brotchie & Co.
Burke & Co.
Cowan, A., & Sons.
Cunningham, J. & J.
Darbyshire, MacKinnell & Co.
Dundee Seal Fishery Company.
Eaton, H. W., & Sons.
Edinburgh Ropery Company.
Evans, Lescher & Evans.
Evans, Sons & Co.
Ferguson, Alexander.
Fortnum & Mason.
Gardiner, Jos., & Co.
Gilroy Brothers.
Gordon & Co.
Harris, S. & H.
Hazeon, T., & Co.
Heal & Son.
How & Barclay.
Hubbuck, Joseph.
Hume, John.
Johnson, Matthey & Co.
Johnstone, S. P.
Keiller & Sons.
Lawson Seed Company.
Lewis & Peat.
Matthews, J., & Co.
McAndrews & Co.
McLean & Hope.
Meyers & Davis.
Minier, Nash & Nash.
Myers, M.
Neilson, H.
Newton, Keats & Co.
Patent Plumbago Crucible Company.
Patry & Pasteur.
Piesse & Lubin.
Price's Patent Candle Company (Limited).
Rose & Wilson.
Royal British Commissioners.
Samuelson, E.
Singlehurst & Co.
Smith, R. M.
Stead Brothers.
Swan Brothers.
Tobin, J. A.
Wigan & Co.

INDIA RUBBER, INDIA RUBBER BELTING, PACKING, HOSE & FABRICS, &c., GUTTA PERCHA, VULCANITE.

Birnbaum, B.
Daft, T. B.
Duncan, Flockhart & Co.
Harry, W. D., & Co.
Hill, H., & Sons.
Hooper's Telegraph Works (Limited).
India Rubber, Gutta Percha, and Telegraph Works Company (Limited).
Lee, H. N, & E.
North British Rubber Company.
Schletter & Co.
Siemens Brothers.
Stewart, S. R., & Co.
Telegraph Construction and Maintenance Company (Limited).
Warne, William, & Co.

INKS AND INKSTANDS.

Binko, H. Bock.
Blackwood & Co.
Collings & Wallis.
Lyons, Wm.
Stephens, H. C.
Ward, Edwin.
Webster, H.

IRON, IRON PLATE, FORGINGS, TUBES, CASTINGS, TANKS, BEDSTEADS, &c.

Baldwin, E. P. & W.
Barnard, Bishop & Barnards.
Bessemer Steel and Ordnance Company (Limited).
Bowling Iron Company (Limited).
Broughton Copper Company.
Brown, J., & Co. (Limited).
Brunner & Co.
Budde, C., & Co. (Limited).
Burney & Co.
Cammell, Charles, & Co.
Ceylon.
Clark & Co.
Clark, Brothers & Odling.
Coalbrookdale Company.
Collings & Wallis.
Francis, T., & Co.
Hill & Smith.
Hind, H., & Son.
Kirkstall Forge Company.
Lichtscheindl & Co.
Macfarlane, W., & Co.
Murray, G. W.
Patent Nut and Bolt Company (Limited).
Peyton & Peyton.
Scott, Geo. L.

IRON, &c.—cont.
Sharp, Stewart, & Co.
Siemens, C. William.
Smith, F., & Co.
Whitley Partners.
Winfield & Co.

IRON BUILDINGS & CONSTRUCTION.
Coalbrookdale Company.
Croggon & Co.
Fletcher, Lowndes & Co.
Hemming, S. C., & Co.
Howitt, W., & Co.
Lloyd, Edwin.
Smith, J. K., & Co.

IVORY, TORTOISESHELL, BONE & HORN WARES.
Atkinson, J. & E.
Hill, H., and Sons.
Myers, M.
Schletter & Co.
Stewart, S. R., & Co,

JAPANNED AND LACQUERED WARES.
Benham & Sons.
Collings & Wallis.
Feetham, M., & Co.
Perkins, B., and Sons.
Peyton & Peyton.
Schletter & Co.
Winfield, R. W., & Co.

JEWELLERY, TRINKETS, AND JEWEL CASES.
Aitchison, James.
Bahamas.
Betjemann, G., & Sons.
Ceylon.
Goggin, Jeremiah.
Hancocks & Co.
Jeffreys, Charles.
Klaftenberger, C. J.
New Zealand.
Sage, F.
Schletter & Co.
Smith & Wright.
Thomas, W. J.
West Africa.
Whiteley, William.

LACE NET, LACE DRESSES, CURTAINS, &c.
Carington, The Lady.
Copestake, Moore, Crampton & Co.
Jacoby, M., & Co.
Lester, C. & T.
Rowe, Mrs.
Simon, May & Co.
Smith, Geo. J.
Stade, H. & L.

LAMPS, LANTERNS, AND SAFETY LAMPS.
Gardner, John, & Sons.
Jeffreys, Charles.
Pillischer, M.
Skelton, T. A.
Watson, Hy.
Young's Paraffine, Light & Mineral Oil Company.

LATHES.
Combe & Barbour.
Hind, H., & Son.
New, D., & Co.
Sharp, Stewart & Co. (Limited).

LAWN MOWERS.
Barnard, Bishop & Barnards.
Brown, J. B., & Co.
Follows & Bate.
Milburn, Wm.
Williams & Co.

LINEN YARNS, THREAD AND FABRICS.
Ainsworth, T.
Barbour, W., & Sons.
Betzold, George & Co.
Bruce & Co.
Coats, J. & P.
Dicksons, Ferguson & Co.
Fenton, S. G., & Co.
Fenton, Son & Co.
Jaffé, Brothers.
Johnson, Jabez & Fildes.
Lloyd, Attree, & Smith.
Marshall & Co.
Moore & Weinberg.
Pegler, C., Junr., & Co.

LITHOGRAPHIC PRINTING PRESSES AND MATERIALS.
Bartholomew, John.
Butt, J. Acton.
Cornelissen & Talle.
Day, John B.
Grant & Co.
Johnson, J. M., & Sons.
Hughes & Kimber.
Mauritius.

LOCKS.
Chatwood, Saml.
Hobbs, Hart & Co.

LOOMS AND ACCESSORIES FOR WEAVING.
Barraclough, Thos.
Blezard, James, & Sons.
Brown & Co.
Hodgson, George.
Irving & Sellers.
Livesey, H.

LUBRICATORS, LUBRICATING OILS AND GREASES.
Clarke & Dunham.
Denton & Jutsum.
Fleming, A. B., & Co.
Price's Patent Candle Company (Limited).
Young's Paraffine Oil Company.
Whitley Partners.

MALLEABLE IRON CASTINGS.
Barnard, Bishop & Barnards.
Clark, Brothers & Odling.
Coalbrookdale Company.
Francis, T., & Co.

MALT AND MALT MACHINERY.
Barnard, W.
Boby, R.
Plunkett, John, & Co.

MANGLES.
Barnard, Bishop & Barnards.
Bradford, T., & Co.
Hornsby, R., & Sons.

MANURES, AND MANURE DISTRIBUTORS.
Coleman & Morton.
Cunningham, J. & J.
Fowler, G. & T.
Garrett, Richard, & Sons.
Gibbs, James, & Co.
Hornsby, R., & Sons.
London Manure Company.
Packard, E., & Co.
Smyth, J., & Son.
Spence, J. Berger, & Co.

MAPS AND MAP ENGRAVING.
Bartholomew, John.
Johnston, W., & A. K.
Leighton, John, F.S.A.
New Zealand.
Sunday School Union.

MARKING INK.
Binko, H. Bock.
Blackwood & Co.
Bond, M. A.
De Leon, M.

MATHEMATICAL, SURVEYING, MEASURING AND OTHER SCIENTIFIC INSTRUMENTS, RULES, &c.
Adams, W. M.
Pillischer, M.
Rabone, John, & Son.
Science and Art Department.

MILITARY EQUIPMENTS, &c.
Adams & Co. (Limited).
Atkins, F. H., & Co.
Daw, G. H.

MILITARY EQUIPMENTS, &c.—cont.
Edgington, John, & Co.
Fagg Brothers.
Gardner, John, & Son.
Leveson, Major.
Mayo, Dr. C.
Minshull & Co.
Shipley, John.

MILKING MACHINE.
New Milking Machine Company.

MILLS, MILLSTONES AND UTENSILS.
Barford & Perkins.
Clarke & Dunham.
Corcoran, Bryan, Witt & Co.
Follows & Bate.
Heslop & Wilson.
Hunt & Tawell.
Huxhams & Brown.
Page, E., & Co.
Woods, Cocksedge & Warner.

MINING, QUARRYING, &c.
Broad, W.
Clark, J. R.
Minton, Hollins & Co.
McKean & Co.

MODELS.
Armstrong, Sir W. G., & Co.
Barford & Perkins.
Carter, Dunnett & Beale.
Chatwood, Samuel.
Denny, W., & Brothers.
Donkin, B., & Co.
Eaton, J. R.
Improved Industrial Dwellings Company.
Kaulbach, E.
Lawrence, W., & Co.
Martin, Claude.
Moseley, Andrew, & Fulham, D. S.
Moy & Shill.
Norman, S. W.
Ormerod, Miss E.
Packard, E., & Co.
Redman, John B.
Reid, B., & Co.
Siemens, C. William.
Smith, Wasteneys.
Sutton & Sons.
Whitwell, Thomas.
Wallis & Steevens.

MOSAICS.
Clarke, Caspar.
Directors of Convict Prisons.
Taylor, R. Minton.

MOWING MACHINES.
Bamlett, A. C.
Barnard, Bishop & Barnards.
Brigham & Co.

MOWING MACHINES—cont.
Brown, J. B., & Co.
Follows & Bate.
Hornsby & Sons.
Howard, J. & F.
Lewis & Co.
Milburn, William.
Samuelson & Co.
Williams & Co.

MUSIC AND MUSICAL INSTRUMENTS.
Atkins, C., & Co.
Augener & Co.
Ivory, Henry A., & Co.
Kirkman, J., & Son.
White, John.

NAILS, SPIKES, SCREWS, &c.
Collings & Wallis.
Everitt, A., & Sons.
Francis, T., & Co.
Homes & Hickton.
Patent Nut & Bolt Company.
Walker Forged Screw and Bolt Company.

NATURAL HISTORY.
Bahamas.
Blackwood & Sons.
Damon, R.
Gerrard, E.
Mauritius.
New Zealand.
Trinidad.
Victoria.
Ward, H.
West Africa.

NEEDLES.
Avery, W., & Son.
Hayes, Crossley & Co.
Kirby, Beard & Co.
Milward, H., & Sons.
Schletter & Co.
Smith, John Wright.
Woodfield, W., & Sons.

OILS, OIL CAKE, AND OIL MILL MACHINERY.
Banner, Samuel.
Bell, J., & Co.
Bewicke, David, & Co.
Bush, W. J., & Co.
Cunningham, J. & J.
Ceylon.
Denton & Jutsum.
Dundee Seal and Whale Fishing Company.
Fleming, A. B., & Co.
Matthews, J., & Co.
McCombie, James, & Co.
Pols, J. A.
Price's Patent Candle Company (Limited).

OILS, &c.—cont.
Rose & Wilson.
Sibree, Peter.
Sissons, Brothers & Co.
Young's Paraffine Oil Company.

OIL STONES AND HONES.
Hazeon & Co.

OPTICAL INSTRUMENTS, MICROSCOPES, AND OPTICAL TOYS.
Binko, H. Bock.
Browning, John.
Pillischer, M.

ORES AND ORE CRUSHERS.
Ceylon.
Dunston Engine Works Company.
Newton, Keats & Co.
New Zealand.
Victoria.

OYSTERS.
South of England Oyster Cultivating Company.

PAPER AND STATIONERY.
Betjemann & Sons.
Cowan, A., & Sons.
Hill, H., & Sons.
Lee, Jas. Abraham.
Lyons, William.
McLean & Hope.
McNicol, J.
Portal, W. S. & R.
Patent Waterproof Paper & Corrugated Fibre Company.
Saunders, T. H.
Stephens, H. C.

PAPER-MAKING, CUTTING, GLAZING, AND PERFORATING MACHINES.
Barraclough, Thomas.
Bertram, Jas., & Son.
Corcoran, Bryan, Witt & Co.
Donkin, B., & Co.
Hughes & Kimber.
Watson, Henry.

PAPER MÂCHÉ WORK.
Benham & Sons.
Collings & Wallis.

PARAFFINE, PETROLEUM, &c.
New Zealand.
Price's Patent Candle Company.
Young's Paraffine, Light & Mineral Oil Company.

PEAT, FUEL, PEAT CONDENSING MACHINE, AND FUEL ECONOMISERS.
Bell, Andrew.
Clayton, Son, & Howlett.
Green, Edward, & Son.
Page & Co.

PEAT, &c.—cont.
Twibill, Joseph.
Whitley Partners.

PENS, PENHOLDERS, AND PENCIL CASES.
Brandauer, C.
Gillott, Joseph, & Sons.
Leonardt, D., & Co.

PERFUMERY AND TOILET REQUISITES.
Atkinson, J. & E.
Betjemann, G., & Sons.
Collings & Wallis.
Crown Perfumery Company.
Dinneford & Co.
Kent, G. B., & Co.
Perkins, B., & Son.
Piesse & Lubin.
Rimmel, Eugène.
Rowland, A., & Son.
Schletter & Co.
Stamp, E. B.
Storer, Joseph.
Tayler, D. F., & Co.

PHOTOGRAPHS, ETCHINGS. PHOTOGRAPHIC APPARATUS, &c.
Beau, Adolphe.
Beasley, F., Junr.
Brownrigg, J. M.
Burke, J. H.
Cameron, Mrs. Julia M.
Crawshay, R. J.
Ferneley, Charles A.
Godbold, H. J.
Gray, B.
Haes, Frank.
Hare, George.
Harman, J. S.
Heath, Vernon.
Hughes & Kimber.
Lemère, Bedford.
Lewis, Abel.
London Stereoscopic Company.
McLachlan, L.
New Zealand.
Robinson & Cherrill.
Science and Art Department.
Smith & Coventry.
Twyman, C.
Victoria.
Wane, Marshall.
Whitworth, Sir Joseph, & Co.
Woodbury Permanent Process Company.
Wortley, Colonel H. Stuart.

PINS, HAIR PINS, HOOKS AND EYES, &c.
Avery, W., & Son.
Kirby, Beard & Co.
Tayler, D. F., & Co.

PLANING MACHINES FOR IRON WORK.
Huxhams & Brown.
New, D., & Co.
Robinson, T., & Son.
Sharp, Stewart & Co.
Whitley Partners.

PLATINUM, PALLADIUM, AND OTHER RARE METALS.
Johnson, Matthey & Co.
New Zealand Government.

PLAYING CARDS.
English, J., & Co.
Jones, Owen.

PLUMBAGO, BLACKLEAD.
Ceylon.
Plumbago Crucible Company.

PNEUMATIC APPARATUS, &c.
McKean & Co.
Siemens Brothers.
Zimdars, C. E.

POLISHING POWDERS, PASTES, BATH BRICK, &c.
Adams, John.
Alexander, Richard.
Borwick, G., & Sons.
Colthurst, Symons & Co.
Hammill, J. B.
Pickering, Joseph.

POPLINS.
Atkinson, R., & Co.
Pim, Brothers & Co.
Smale, Josiah, & Sons.

PRESERVED PROVISIONS AND CONSERVES.
Batty & Co.
Ceylon.
Crosse & Blackwell.
English Condensed Milk Company.
Fortnum, Mason & Co.
Geyelin & Co.
Hewitson & Co.
Keiller, J., & Sons.
King, Fredk., & Son.
Mackay, John.
Mauritius.
McCall, John, & Co.
McCombie, J., & Co.
Moir, John, & Son.
Victoria.
West Africa.

PRINTING.
British and Foreign Bible Society.
Grant & Co.
Johnson, J. M., & Sons.
Reed & Fox.
Religious Tract Society.
Sunday School Union.

PRINTING INK.
Bewicke, David, & Co.
Cornelissen & Talle.
Fleming, A. B., & Co.

PRINTING TYPES & MACHINERY, STAMPS, &c.
Cropper, H. S., & Co.
De Leon, Maurice, & Co.
Derham, John J.
Hughes & Kimber.
Stephenson, Blake & Co.
Tickle, R. P.
Victory Printing and Folding Machine Manufacturing Company.
Wyon, J. S. & A. B.

PULLEY BLOCKS, &c.
Corcoran, Bryan, Witt & Co.
Head, Wrightson & Co.
Hudswell, Clarke & Rodgers.
Pickering, Jonathan.
Tangye Brothers & Holman.

PUMPS AND PUMPING ENGINES,
Bernays, J.
Blakeborough, Jos.
Brotherhood & Hardingham.
Brown, Brothers & Co.
Clark, Edward.
Clarkson Brothers.
Dewrance, J., & Co.
Gwynne, J. & H.
Gwynne & Co.
Haynes, Thomas, & Sons.
Murray, G. W.
Sibree, Peter.
Tyler, Hayward, & Co.
Warner, John, & Sons.
Wilson, Alex., & Co.
Wright, Sutcliffe & Son.

QUILLS AND QUILL PENS.
Hill, H., & Sons.
Stephens, H. C.

RAILS, RAILWAY PLANT, CARRIAGES, SIGNALS, &c.
Baines, William.
Bessemer Steel Company.
Brown, J., & Co. (Limited).
Cammell, Charles, & Co.
De Bergue, C., & Co.
Dering, Geo. E.
Eastons & Anderson.
Fox, Walker & Co.
Hadfield, Robert.
Hill & Smith.
Holmes & Taylor.
Kirkstall Forge Company.
Landore Siemens Steel Company.
Patent Nut and Bolt Company (Limited).
Saxby & Farmer.

RAILS, &c.—cont.
Simon, H., C.E.
Thomson & Co.
Welch, A.
Wilson-Hawksworth, Ellison & Co.
Whitley Partners.
Zimdars, C. E.

REAPING MACHINES.
Bamlett, A. C.
Brigham & Co.
Burgess & Key.
Hornsby & Sons.
Howard, J. & F.
Lewis & Co.
Samuelson & Co.

REFRIGERATORS AND ICE SAFES.
Brotherhood & Hardingham.
Kent, Geo.
Lawrence, W., & Co.
Siebe & Gorman.
Siebe & West.

RICE AND PREPARATIONS OF RICE.
Berger, S., & Co.
Colman, J. & J.
Jones, Orlando & Co.

RIVETS AND RIVET-MAKING MACHINERY.
De Bergue, C., & Co.
Everitt, A., & Co.
Patent Nut and Bolt Company.
Walker Forged Screw and Bolt Company.

SADDLERY AND HARNESS.
Brace, H., & Co.
Christie, William.
Ellam, Benjamin.
Lennan, W., & Son.
Middlemore, Wm.
Schletter & Co.
Swaine & Adeney.

SALT.
Corbett, John.
Goodall, Backhouse & Co.
McCraw, E. C., & Co.

SANITARY APPARATUS, SANITARY POTTERY, WATER CLOSETS, &c.
Benham & Sons.
Blews, W., & Sons.
Brown-Westhead, Moore & Co.
Busby, Thos.
Doulton, H., & Co.
Gabrielli, A.
Leveson, Major.
Jennings, G., & Co.
Ransome, A., & Co.

SANITARY APPARATUS, &c.—cont.
Warner, John, & Sons.
Wedgwood, Josiah, & Sons.
Wright, Sutcliffe & Son.

SAWS, SAWING MACHINERY AND SAW SHARPENING MACHINERY.
Kenyon, John, & Co.
Lewin, S.
Marshall, Sons & Co. (Limited).
Powis, James, Western & Co.
Ransome, A., & Co.
Robey & Co.
Robinson, T., & Son.
Ruston, Proctor & Co.
Spear & Jackson.
Taylor Brothers.
Worssam, Samuel, & Co.

SCHOOL FITTINGS AND FURNITURE.
Blezard, James, & Son.
Callaghan, William.
Hammer, Geo. M.
Hawes, Geo. E.
Moss, John F.
Ward, T.

SEEDS, ROOTS, PLANTS, &c.
Carter, Dunnett & Beale.
Lawson Seed and Nursery Company.
Minier, Nash & Nash.
Ormerod, Miss E.
Radclyffe, Dick, & Co.
Raynbird, Caldecott, Bawtree, Dowling & Co.
Rose & Wilson.
Sutton & Sons.
Tobin, J. A.

SEWAGE, TREATMENT AND PRODUCTS.
British Seaweed Company.
Scott's Sewage Company.

SEWING MACHINES.
Bacon, G. W., & Co.
Bradbury & Co.
Holmes, J. E.
Nussey & Pilling.
Wanzer, R. M., & Co.
Wanzer Sewing Machine Company.

SHEEP DRESSING COMPOSITIONS.
Calvert, F. C., & Co.
Clarke, G. B.

SHIP MODELS, SHEATHING, MACHINERY, IRON WORK, &c.
Denny, W., & Brothers.

SHIP MODELS, &c.—cont.
Engert & Rolfe.
Homes & Hickton.
Kynaston, Mrs. C. M.
Laird Brothers.
Lumley, Henry.
Martin, Claude.
Palmer's Ship Building and Iron Company.
Reed, E. J., C.B.

SHOW CASES AND SHOP FITTINGS.
Drew, John.
Jeffreys, C.
Sage, F.
Sommerville & Smith.

SILK MACHINERY.
Livesey, H.

SILK—RAW, SILK YARN SEWING SILK, CORD, &c.
Brocklehurst & Sons.
Eaton, Henry W., & Sons.
Goldschmidt & Sipman.
Hadwen, John, & Sons.
Mauritius.
Paterson, W., & Sons.
Pearson, Samuel, & Co.
Posselt, Peters & Co.
Potts, Wright & Co.
Rickards, C. A.
Salomons, L., & Co.
Smale, Josiah, & Sons.
Victoria.

SILKS AND VELVETS, MIXED GOODS, SILK LACE, SHAWLS, &c.
Atkinson, R., & Co.
Brocklehurst & Sons.
Copestake, Moore, Crampton & Co.
Cornes, W. W., & Co.
Critchley, Brinsley & Co.
Evans, D., & Co.
Goldschmidt & Sipman.
Jackson, J. & F.
Jacoby, M., & Co.
Lloyd, Attree & Smith.
Mellor, James.
Nicholson, J. O.
Patterson, W., & Sons.
Pearson, Samuel, & Co.
Pim, Brothers & Co.
Potts, Wright & Co.
Slater, Buckingham & Co.
Smale, Josiah, & Sons.
Smale, William.
Welch, Margetson & Co.

SKINS, FURS, LEATHER, LEATHER GOODS, LEATHER WORKING MACHINES, AND SUBSTANCES USED IN TANNING.
Corcoran, Bryan, Witt & Co.
Clark, Son, & Morland
Deed, J. S., & Sons.
Dixon, John, & Son.
Drew, John.
Ecroyd, W., & Son.
Edwards, W. J.
Evans, P. & S., & Co.
Holgate, J., & Co.
Huxhams & Brown.
Leather Cloth Company.
Middlemore, Wm.
Minshull & Co.
Newton, Gough & Co.
New Zealand.
Norris, S. E., & Co.
Powis, James, Western & Co.
Rabbits, W.
Schletter & Co.
Tanned Leather Company.
Webb & Son.
West Africa.

SLATE AND ENAMELLED SLATE.
Cwmorthin Slate Company.
Ford, Lewis & Co.
Greaves, J. W.
Pen-yr-Orsedd Slate Quarry Company.
Turner, W.
Welsh Slate Company.

SMALL WARES, AS BUTTONS, STUDS, LINKS, BUCKLES, CLASPS, HOOKS AND EYES, &c.
Schletter & Co.
Smith & Wright.
Tayler, D. F., & Co.

SOAP.
Atkinson, J., & E.
Calvert, F. C., & Co.
Cohné, S., & Co.
Crown Perfumery Company.
Field, J. C., & J.
Hemingway, S., & Co.
Price's Patent Candle Company.
Rimmel, Eugène.
Runcorn Soap and Alkali Works Company.

SODA WATER APPARATUS.
Dows, Clark & Co.
Farrow & Jackson.

SPADES AND SHOVELS.
Collings & Wallis.

SPINNING AND TWISTING MACHINERY.
Barraclough, Thomas.
Lawson, S., & Sons.
Livesey, H.

SPRINGS.
Brown, John, & Co. (Limited).
Cammell, C., & Co.
Ingham, J., & Son.
Lichtscheindl & Co.
Smith & Turner.
Thompson & Co.
Wilson-Hawksworth, Ellison & Co

STARCH, STARCH PRODUCTS, AND FIREPROOF STARCH.
Berger, Samuel, & Co.
Colman, J., & J.
Hemingway & Co.
Jones, Orlando, & Co.
Nicoll, D., & Co.
Parsons, Fletcher & Co.
Simmonds, P. L.

STEAM CRANES AND HOISTS.
Appleby Brothers.
Aveling & Porter.
Brown Brothers.
Powis, C., & Co.
Wilson, John H., & Co.

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Adamson, D., & Co.
Appleby Brothers.
Bowling Iron Company (Limited).
Brotherhood & Hardingham.
Brown, John, & Co. (Limited).
Brown & Co.
Cater & Walker.
Davey, Paxman & Co.
De Bergue, C., & Co.
Dewrance, J., & Co.
Galloway, W. J., & Sons.
Howard, J., & F.
Hughes & Kimber.
McKean & Co.
McNicol, John.
Nicholson, W. N., & Son.
Russell, James, & Sons.
Sharp, Stewart & Co.
Twibill, Jos.
Tyler, Hayward & Co.
Whitley Partners.

STEAM ENGINE FITTINGS, FORGINGS, &c.
Baines, W. N.
Blakeborough, Joseph.
Blews, William, & Son.
Bowling Iron Company (Limited).

STEAM ENGINE FITTINGS, &c.—cont.

Brotherhood & Hardingham.
Brown & Co.
Clarke, Edward.
Dennis & Co.
Dewrance, J., & Co.
Hill & Smith.
Holt, H. P.
New, D., & Co.
Russell, James, & Sons.
Sharp, Stewart & Co.
Warner, John, & Sons.
Whitley Partners.

STEAM ENGINES, LOCOMOTIVES, AND TRACTION ENGINES.

Aveling & Porter.
Brotherhood & Hardingham.
Clayton & Shuttleworth.
Cropper, H. S., & Co.
Davey, Paxman & Co.
Derham, John J.
Dewrance, J., & Co.
Foster, W., & Co.
Fowler, J., & Co.
Fox, Walker & Co.
Galloway, W. J., & Sons.
Garrett, Richard, & Sons.
Hornsby, R., & Sons.
Hughes, H., & Co.
Hughes & Kimber.
Lewin, S.
Marshall, Sons & Co. (Limited).
Mather & Platt.
New, D., & Co.
Nicholson, W. N., & Son.
Penn, John, & Sons.
Powis, Charles, & Co.
Ransomes, Sims & Head.
Reading Ironworks Company (Limited).
Robey & Co. (Limited).
Ruston, Proctor & Co.
Tangye Brothers & Holman.
Thwaites & Carbutt.
Turner, E. R., & F.
Wallis and Steevens.
Weetman, John.
Wilson, John H., & Co.
Willsher, John Chaplin.
Woods, Cocksedge & Warner.
Whitley Partners.

STEAM FIRE ENGINES.

Merryweather & Sons.
Shand, Mason & Co.

STEAM HAMMERS, STAMPS, AND STRIKERS.

Davies, D.
Davis & Primrose.

STEAM HAMMERS, &c.—cont.

Derham, John J.
Kirkstall Forge Company.
Massey, B. & S.
Pickering, Jonathan.
Thwaites & Carbutt.
Whitley Partners.

STEAM PLOUGHS, CULTIVATING APPARATUS, AND STEAM ROAD ROLLERS.

Aveling & Porter.
Fowler, J., & Co.
Howard, J. & F.

STEAM PUMPS AND INJECTORS.

Appleby Brothers.
Brotherhood & Hardingham.
Brown, Bayley & Dixon.
Brown Brothers & Co.
Clarkson Brothers.
Hathorn, Davis & Campbell.
Marquis Brothers.
McKean & Co.
Tangye Brothers & Holman.
Tyler, Hayward & Co.
Warner, J., & Sons.
Whitley Partners.
Wilson, A., & Co.

STEEL.

Bessemer Steel Company.
Brown, John, & Co. (Limited).
Cammell, Charles, & Co.
Firth, Thomas, & Sons.
Kenyon, John, & Co.
Landore Siemens Steel Company.
Pearson, F. G., & Co.
Siemens, C. Wm.
Smith, Robert, & Co.
Spear & Jackson.
Wilson-Hawksworth, Ellison & Co.

STEEL RAILS, TYRES, CASTINGS, FORGINGS, SPINDLES, SHUTTERS, AND OTHER GOODS.

Bessemer Steel and Ordnance Company.
Bowling Iron Company (Limited).
Cammell, Charles, & Co.
Ceylon.
Chatwood, Samuel.
Clark & Co.
Landore Siemens Steel Company.
MacDaniel & Co.
Smith, Robert, & Co.
Spear & Jackson.

STILLS, &c.

Dudgeon, A.

STONE DRESSING AND MOULDING MACHINES, STONE AND ORE BREAKING MACHINES.
Dunston Engine Works Company.
Heslop & Wilson.
Huxhams & Brown.
Marsden, H. R., & Co.
Patent Machine Stone Dressing Company.
Powis, James, Western & Co.

STONE, STONE WARE, MARBLE WORK, &c.
Benham & Sons.
Burke & Co.
Doulton, H., & Co.
Doulton & Watts.
Ford, Lewis & Co.
Minton, Hollins & Co.
Wedgwood & Son.

STOVES, GRATES, FENDERS, AND FIRE IRONS.
Barnard, Bishop & Barnards.
Benham & Sons.
Collings & Wallis.
Feetham, M., & Co.
Pascall, Atkey & Son.
Whitwell, Thos.
Yates, Haywood & Co.

STRAW PLAIT AND FINISHED ARTICLES.
Salomons, L., & Co.
Vyse, Sons, & Co.

SUBMARINE APPARATUS, DEEP SEA SOUNDINGS, &c.
Holmes & Taylor.
Siemens Brothers.

SUGAR.
Ceylon.
Mauritius.

SURGICAL AND MEDICAL INSTRUMENTS AND APPLIANCES.
Ash, C., & Sons.
Duncan, Flockhart & Co.
Gray, Philip.
Lang, D., & Co.
Lee, H. N., & E.
Norman, S. W.
Rein, C. F., & Son.
Rein, Mrs. C. F.
Salt & Son.
Ward, J.
Warne, W., & Co.
Whitehead, R. R., & Brothers, (Limited).

TABLE FOUNTAINS.
Storer, Joseph.

TAPESTRY.
Corbière, E., & Son.
Tapling, Thomas, & Co.
Templeton, J., & J. S.
Widnell, Henry, & Co.

TEA.
Ceylon.
India.

TELEGRAPHIC APPARATUS AND MATERIALS.
Brown & Co.
Hooper's Telegraph Works.
India Rubber, Gutta Percha, and Telegraph Works Company (Limited).
Johnson, Richard, & Nephew.
Patent Nut and Bolt Company.
Russell, James, & Sons.
Siemens Brothers.
Smith, Frederick, & Co.
Vavasseur, J., & Co.
Wedgwood, Josiah, & Sons.

TENTS, MARQUEES, AND FLAGS.
Edgington, J., & Co.
Leveson, Major.
Unite, John.

TERRA-COTTA WORK.
Doulton, H., & Co.
Hudspith, W.
Pellatt & Wood.
Royal Porcelain Works, Worcester.
Silicated Carbon Filter Company.
Wood & Ivery.

THRASHING AND FINISHING MACHINES.
Clark Brothers & Odling.
Clayton & Shuttleworth.
Foster, W., & Co.
Garrett, Richard, & Sons.
Hornsby, R., & Sons.
Lewin, Stephen.
Marshall, Sons & Co. (Limited).
Murray, G. W.
Nalder & Nalder.
Ransomes, Sims & Head.
Reading Iron Works (Limited).
Robey & Co. (with iron frames).
Ruston, Proctor & Co.
Turner, E. R., & F.
Wallis & Stephens.
Weetman, John.
Willsher, John Chaplin.
Woods, Cocksedge & Warner.

TILES AND TILE MACHINES.
Mintons.
Minton, Hollins & Co.
Simpson, W. B., & Sons.
Taylor, R. Minton.

TIN, TIN PLATES, TIN WORK, TIN FOIL.
Baldwin, E. P. & W.
Budde, C., & Co.
Elmslie, E. W.
Landore Siemens Steel Company (Limited).
Perkins, B., & Son.
Sanders, H. G.
Schletter & Co.
Thomas, Richard, & Co.
Tin-plate Decorating Company.
Walker, Campbell & Co.
Whitley Partners.

TOBACCO, CIGARS, AND TOBACCO MACHINERY.
Bahamas.
Grunebaum, J.
Jamaica.
Samuelson, E.
Weston, John.

TOOLS, EDGE AND OTHER.
Collings & Wallis.
Fussell, James, Sons, & Co.
Kenyon, John, & Co.
Milward, J. F.
Pearson, F. G., & Co.
Rabone, John, & Son.
Russell, James, & Sons.
Schletter & Co.
Smith, Robert, & Co.
Spear & Jackson.
Ward & Payne.
Whitley Partners.
Wills, A. W.
Wilson-Hawksworth, Ellison & Co.

TORPEDOES.
Armstrong, Sir W. G., & Co.
Siemens Brothers.
Vavasseur, J., & Co.

TRAVELLERS' INFORMATION OFFICE.
Cook, Thomas, & Son.

TRAVELLING ARTICLES, TRUNKS, &c.
Coltman, W.
Drew, J., & Co.
Middlemore, William.

TUBES, TUBE EXPANDERS, AND SCRAPERS.
Blews & Sons.
Broughton Copper Company.
Brown & Co.
Budde, C., & Co.
Everitt, Allen, & Sons.
Russell, James, & Sons.
Twibill, Joseph.
Warne, W., & Co.
Whitley Partners.
Winfield & Co.

TURBINES.
Donkin, B., & Co.
Gwynne & Co.
Warner & Sons.

UMBRELLAS, PARASOLS, &c.
Sangster & Co.
Schletter & Co.
Slater, Buckingham & Co.
Welch, Margetson & Co.

VARNISHES.
Bewicke, David, & Co.
Cornelissen & Talle.
Denton & Jutsum.
Fleming, A. B., & Co.
Mander Brothers.
Sanderson, A., & Co.
Sissons Brothers, & Co.

VENTILATING APPARATUS.
Feetham, M., & Co.
Scott, George L.

WASHING, &c., MACHINES, & FLUIDS.
Bradford, T., & Co.,
Hornsby, R., & Sons.
Watkins, A. T.

WASTE MATERIALS, UTILIZATION OF.
Simmonds, P. L.
Mond, Ludwig.

WATER SUPPLY APPARATUS AND FITTINGS, WATER BOILING APPARATUS, WATER METERS.
Benham & Sons.
Blakeborough, Joseph.
Blews, William, & Sons.
Dewrance, J., & Co.
Gabrielli, A.
Kennedy's Patent Water Meter Company.
Laurence & Co.
Russell, James, & Sons.
Warner, John, & Sons.
Whitley Partners.

WATERPROOF ARTICLES.
Birnbaum, B.
Nicoll, D., & Co.

WAX, WAX CANDLES, &c.
Field, J. C., & J.
Hill, H., & Sons.
Stephens, H. C.

WEIGHTS AND WEIGHING MACHINES.
Baxter, W. H.
Blews & Sons.
Johnson, Matthey & Co.
Whitley Partners.

WHEAT PROTECTOR.
Clarke, G. B.
Down & Co.

WHIPS AND WALKING STICKS.
Brace, H., & Co. (Limited).
Davis, G., Son & Co.
Ellam, Benjamin.
Meyers & Davis.
Peagam, J. J. R.
Schletter & Co.
Swaine & Adeney.

WINES, SPIRITS, CIDER, &c.
Ceylon.
Dunville & Co.
Goodall, Backhouse & Co.
Henley & Son.
Parkington, J. R., & Co.
Robur Distillery Company.
Victoria.

WINNOWING MACHINES.
Nicholson, W. N., & Son.
Reid, Benj., & Co.

WIRE, WIREWORK, AND WIRE BRIDGES.
Bateman, D., & Son.
Brown, J. B., & Co.
Budde, C., & Co.
Corcoran, Bryan, Witt & Co.
Clarke & Dunham.
Everitt, Allen, & Sons.
Hill & Smith.
Johnson, Richard, & Nephew.
Johnson, R., Clapham & Morris.
Reid, Benjamin, & Co.
Smith, F., & Co.
Tayler, D. F., & Co.
Wilson-Hawksworth, Ellison & Co.
Winfield & Co.

WOOD CARVING.
Minns. J.

WOOD, WOODWORK, AND WOODWORKING MACHINERY.
Ceylon.
Derham, John J.
Duncan, J.
Ellis, William.
Gardiner, Jos., & Co.
Hopton, Henry, & Son.
India.
Jacob, T.
New Zealand.
Powis, C., & Co.
Powis, James, Western & Co.
Ransome, A., & Co.
Robinson, T., & Son.
Victoria.
Worssam, Samuel, & Co.

WOOL AND WOOLLEN YARNS.
Bowes, J. L., & Brother.
Jones, Pryce.
Neave, S., & Sons.
New Zealand.
Victoria.

WOOL WORKING MACHINERY.
Barraclough, T.
Blezard, James, & Sons.
Hodgson, Geo.
Ingham, J., & Sons.
Irvin & Sellers.
Livesey, Henry.
McNaught, J. & W.
Platt Brothers & Co. (Limited).

WOOLLEN, WORSTED, AND MIXED FABRICS.
Bliss, W., & Son.
Birchall, J. D., & Co.
Brace, H., & Co. (Limited).
Cogswell, J., & Co.
Day, Howgate & Holt.
Hepworth, B., & Son.
Hitchcock, Williams, & Co.
Hooper, C., & Co.
Jacoby, M., & Co.
Jones, Pryce.
Jones, Evans & Co.
Kerr, Scott & Son.
King, W.
Lees, R.
Mitchell, J., & Co.
Newell, C. J.
New Zealand.
Nicoll, D., & Co.
Peel, Brothers, & Co.
Poole, H., & Co.
Scarborough Brothers.
Smith, W., Junr.
Strachan & Co.
Stretton & Co.
Victoria.
Waters, J. & E., & Co.
Webster, J., & Son.
Welch, Margetson & Co.
Whitehead, R. R., & Brothers (Limited).
Zossenheim Brothers.

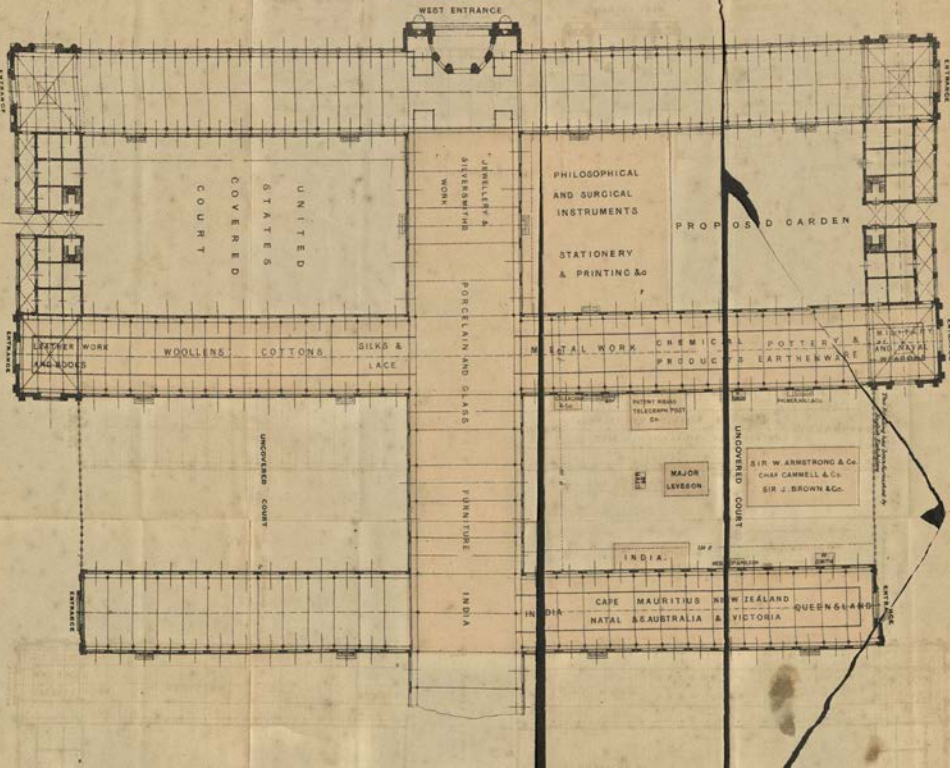
WORK BOXES.
Betjemann & Sons.
Nevill, Lady D.

WRITING DESKS, &c.
Betjemann & Sons.
Collings & Wallis.
Goggin, Jeremiah.

YARN PRINTING MACHINE.
Barraclough, Thomas.

VIENNA UNIVERSAL EXHIBITION, 1873

SPACE ALLOTTED TO GREAT BRITAIN. INDUSTRIAL BUILDING.



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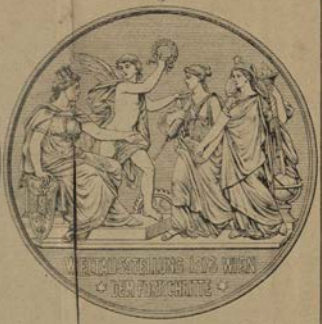

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The reverse of all

Vinders Brooks, Day & Son, Lith.

PRIZE MEDALS AWARDED AT THE VIENNA UNIVERSAL EXHIBITION.

ACCORDING to the General Programme of the Exhibition, there were five different kinds of medals awarded as prizes by the International Jury, namely—

1. MEDAL FOR FINE ARTS;
2. MEDAL FOR GOOD TASTE;
3. MEDAL FOR PROGRESS;
4. MEDAL FOR CO-OPERATORS;
5. MEDAL FOR MERIT.

The medals are of the same size, each seven centimetres in diameter. They are of bronze, and bear on the obverse the portrait of His Majesty the Emperor, with the inscription, in German:

"FRANZ JOSEPH I., KAISER VON OESTERREICH, KOENIG VON BOEHMEN, ETC., APOST. KOENIG VON UNGARN."

(Francis Joseph I., Emperor of Austria, King of Bohemia, &c., Apostolic King of Hungary.)

The reverse side of all five medals is adorned with artistic emblems, the design of which was left to the respective artists.

These emblems on the reverse side of the medals bear the following inscriptions:

1. On the Medal for Fine Arts—"Weltausstellung, 1873, Wien. Für Kunst." (*Universal Exhibition*, 1873, *Vienna. For Fine Art.*)
2. On the Medal for Good Taste—"Weltausstellung, 1873, Wien. Für guten Geschmack." (*Universal Exhibition*, 1873, *Vienna. For Good Taste.*)
3. On the Medal for Progress—"Weltausstellung, 1873, Wien. Dem Fortschritte." (*Universal Exhibition*, 1873, *Vienna. For Progress.*)
4. On the Medal for Co-operators—"Weltausstellung, 1873, Wien. Dem Mitarbeiter." (*Universal Exhibition*, 1873, *Vienna. To the Co-operator.*)
5. On the Medal for Merit—"Weltausstellung, 1873, Wien. Dem Verdienste." (*Universal Exhibition*, 1873, *Vienna. For Merit.*)

The Medal for *Fine Arts* is for distinguished art productions exhibited in Group XXV. It represents on the reverse side the Goddess of the capital of Vienna, with the mason's crown, by her side a genius, on whose lap rests a cushion with wreaths. Around the Goddess are representatives of sculpture, architecture, and painting, whom she crowns with laurel wreaths.

The Medal for *Good Taste* is for exhibitors of Articles of Industry, the form and colour of which constitute the characteristic features for adjudication. It shows on the reverse side three Greek female figures (Muses and Graces), surrounded by objects of Art and Artistic Industry, which they are admiring.

The Medal for *Progress* is for exhibitors in Groups I. to XXIII., and in Group XXVI., whose new inventions testify marked progress in the introduction of novel materials, contrivances, &c., as compared with similar productions shown at previous Exhibitions. It represents a female figure followed by Immortality passing the Goddess of the country, who sends a genius with a laurel wreath to meet her.

The Medal for *Co-operators* is for such persons who, as managers of manufactories, as foremen, designers of patterns, modellers, or as general assistants, are nominated on the part of the exhibitors, on account of the leading part they have taken in the features of excellence of the productions, or in the increase of their sale. It shows on the reverse side a mechanic examining the parts of a machine, which his assistant has just finished, and for the completion of which he is crowned by the genius of labour with a laurel wreath.

The Medal of *Merit* was awarded to exhibitors who laid claim to excellence and perfection in material and workmanship, large extent of production, the opening of new markets, the employment of improved tools and machinery, and cheapness of produce. It shows on its reverse side the reward for labour and domestic industry.

Note.—At a preliminary meeting of the Council of Presidents, it was decided that the Medals for Progress, Merit, and Good Taste were absolutely equal in value.

AWARDS OF THE INTERNATIONAL JURY TO GREAT BRITAIN (exclusive of India and the Colonies).

DIPLOMAS OF HONOUR.

Group	2	4
„	5	3
„	7	6
„	8	1
„	9	2
„	11	1
„	12	1
„	13	5
„	14	1
„	16	1
„	22	1
		26

MEDALS.

	Progress.	Merit.	Good Taste.	Fine Art.
Group 1	1	3	—	—
„ 2	9	13	—	—
„ 3	9	16	—	—
„ 4	8	8	—	—
„ 5	27	60	1	—
„ 6	5	7	2	—
„ 7	18	44	—	—
„ 8	—	4	—	—
„ 9	5	3	—	—
„ 10	—	9	1	—
„ 11	3	5	—	—
„ 12	4	11	2	—
„ 13	34	38	—	—
„ 14	4	6	—	—
„ 15	1	—	—	—
„ 16	1	3	—	—
„ 17	—	4	—	—
„ 18	4	4	—	—
„ 21	—	2	—	—
„ 23	—	1	—	—
„ 25	—	—	—	35
„ 26	1	3	—	—
Use of Waste	—	1	—	—
	134	245	6	35
	420			

MEMORANDUM on the RETURN and FORWARDING of GOODS from the VIENNA UNIVERSAL EXHIBITION, 1873, by W. M. PIETERS, Esq.

IT appears that the severe test to which the arrangements of the General Direction for the proper receipt of goods were subjected and the enormous working expenses incurred during the months of March, April, and May, opened the eyes of the Austrian authorities to the necessity of taking extraordinary measures to meet the demand which would be made upon their powers of execution during the period of returning and forwarding goods to their respective destinations after the close of the Exhibition.

The General Direction placed the monopoly of the business of the transport and removal in the hands of a contractor whose duty it was to collect and load goods, to control the entire working of the railway arrangements inside the enclosures of the Exhibition, and, in one word, to do all that was necessary at a certain charge per ton. This charge was, to say the least, high and varied, of necessity, according to the weight of the different goods.

The General Direction, however, judged it necessary, or, at least, expedient to endeavour to obtain for the proposal the sanction of the different Commissions of the countries represented at the Exhibition. A circular was therefore issued to the Commissioners requesting their presence at a meeting held in the Jury Pavilion, in which the question how to effect the return of goods would be discussed.

On opening this meeting, which was attended by one or two Commissioners of almost every nation, Baron von Schwarz Senborn pointed to the difficult task before them, the extraordinary consideration shown by the General Direction in calling the Commissions together in order to discuss the subject, (a course never adopted previously by directors of former Exhibitions,) and finally stated that he would submit a plan of how the General Direction intended to work the return transport, at the same time inviting the Commissioners present to offer suggestions and remarks in order to arrive in this manner at some result satisfactory to the majority, if not to all.

In reply to this, several of the leading men amongst the Commissioners testified their desire to be left in the sole control of the business of transport, and enjoined the General Direction to take only such measures as might tend to regulate the railway service, and to ensure general safety.

This idea being strongly supported, a lengthened discussion ensued, but no definite result was obtained as the matter was not submitted to a division. The meeting closed, however, without coming to any decision, and the president, instead of submitting the General Direction's scheme to the assemblage promised that within a few days the whole of the regulations would be sent round in print.

The regulations were eventually issued, accompanied by a circular dated the 24th of October 1873 in which the respective Commissions were again desired to make known their remarks and objections at a meeting taking place on the 25th.

These documents were, however, not received by the Royal British Commission, until the 27th of October 1873, so that it was impossible for the Commission in any way to influence the matter.

The British Commission therefore in conjunction with the Commissions, of other nations made certain representations connected with this measure, but this was all that could be done.

In order to give a correct idea of the manner in which the General Direction proposed to do the work it may perhaps be advantageous to print the entire set of rules, tariff of charges, and forms of certificates.

In reading these documents it must, however, be borne in mind,—

1st That a system on paper when applied to the test of actual practice does not always meet the requirements of the case.

2nd. That these regulations were not sent round until the last moment in consequence of which very few exhibitors were aware of their existence at the time of the closing of the Exhibition, and

3rd. That, however well these rules may read, they, even if carried out most conscientiously, involve such a series of formalities, that what with the different white, yellow, red, and green certificates, and the different forms to be observed before the goods could be cleared at the custom house, and the Güter Expeditions Bureau, it is not remarkable that the unfortunate exhibiter was unable to interpret the regulations.

REGULATIONS FOR THE RETURN DISPATCH OF EXHIBITED GOODS.

1.—*General Arrangements.*

1. The exhibition closes on Sunday the 2d of November.

Tickets of Admission.

2. After the close of the Exhibition, that is from the 3rd of November forenoon, the public is not admitted to the Exhibition precincts, but exclusively and without exception only such persons as are immediately engaged in the packing and forwarding operations.

Special tickets of admission will be supplied to the members of the home and foreign exhibition Commissions and their officers.

Form A.

Exhibitors and their representatives are only admitted on production of a "legitimation" (certificate of identity) in Form A of the Appendix, issued by their respective national commissions, and the requisite assistants on production of special tickets to be obtained by the "central-ordner" (controller-general).

These tickets are only available for the duration of the respective separate packing operations on the completion of which they are to be immediately returned.

Note.—These regulations were strictly adhered to, and worked well. It would, however, have been desirable that the issue of the admission tickets to the workmen and people employed for packing, &c., had entirely been left to the different Commissions, so that no one except members of the Austrian General Direction and their staff could have entered the different sections without the sanction of the Commission under whose control it was placed.

Packing of the exhibited goods.

3. In the packing of the exhibited goods, care must be taken to leave the necessary space for circulation unencumbered, and the objects that have been used for exhibiting, such as glass cases, tables, scaffold erections, &c., must be taken away as soon as the packing of the exhibited goods, is completed, so that the further preceedings in the removal of the exhibition goods may not be impeded.

Note.—This article contains some wholesome limits and had it been some one's duty to see that they were not disregarded they would have been a little more effective.

Delivery of the empty packing cases.

4. To obtain delivery of the empty cases stored in the packing case depôt, the Commissions (or the exhibitors, if the latter gave up their own cases for themselves) must hand in written requisitions to the office of the "Kisten-depôt" Industrie Halle A 16 (Arcades), and produce the proper general voucher; these requisitions must indicate the precise spot to which the empty cases are to be delivered, and the time when they will be required.

These requisitions are immediately transmitted from the said office to the depot, which will take charge of the loading and carriage of the empty cases. The numerical order of delivery of these required cases will be determined by that of the requisitions.

In order that no delay may accrue in the delivery of the cases the requisitions are to be made eight days in advance.

The exhibitor or his representative must be present to take delivery of the cases he has required, and on receipt of the cases must hand the general voucher to the official who brings them.

In case the exhibitor or his representative is not present at the unloading, the cases will be stored away in a locality belonging to the "Kistendepôt," from whence the exhibitor will then have to fetch them at his own charge.

Inasmuch as the requisition can only be made on the ground of the general voucher, the commissions and exhibitors who have not yet taken out these vouchers are requested to obtain them at once. The requisition forms are to be obtained at the office of the "Kistendepôt, Industrie Halle, A 16 (Arcades)."

The following system of procedure will be adhered to in the delivery of cases;—

(*a.*) 50 flat open waggons (lorrys) making each three journeys a day will be employed daily for the first three days (3, 4, and 5 November) so that immediately at the commencement, all the national commissions may have a portion of their full complement of cases at their disposal; by this means 450 waggon loads are to come into the Exhibition in the first three days.

(*b.*) But after the first three days a regulated rotation is to be applied to the delivery of the cases, that is to say, such that on every appointed day of the week three commissions specified for that day receive their cases back, for example,

Every Monday, England, France, America; every Tuesday Italy, Switzerland, Sweden, and so forth, the Commissions will be pleased to come to an agreement immediately as to the dates.

(*c*). Those exhibitors who have handed in their cases individually will be appointed,* on requisition for the delivery of their cases, the day on which the cases will be delivered at the Exhibition, so that they may be able to take delivery of them immediately.

(*d.*) The requisitions of individual exhibitors must be made, accompanied by the production of the receipted "hauptcheque," (original voucher,) direct to the "Kisten Bureau," where the number on the voucher, the number of cases, the firm, and the place of delivery are noted; but the "haupt cheque" must only be delivered up against the delivery of the cases, when, in case of need, all complaints, protests, or claims must be made, as after the restoration of the "hauptcheque," no claims of any kind whatsoever can arise.

(*e.*) The delivery of those cases which were sent in through the medium of a Commission will be conducted as follows:—

The three commissions specified for a certain day (cf. point 4) must send a functionary to the Kistendepôt on that day, who shall arrange the loading of the "lorrys" standing ready in such a manner that the cases of his Commission can be conveyed in order to the four principal places (Industry, Agricultural, Machinery, and Art halls.

(*f.*) The following places are appointed for the unloading of the empty cases to be delivered to the commissioners in the Industry hall, in the western parts thereof; for Brazil (*b*), America (*a*), England (*b*), Spain and Portugal (*a*), France (*b*), Switzerland (*a*), Italy (*a*), Denmark and Holland (*b*), Belgium (*b*); for Germany in the Hofs (enclosures) III. and IV. of the Rotunda. The places for unloading empty cases for the Agricultural and Machinery halls will be settled at the time of delivery.

5. An undertaking sanctioned by the General Direction will supply packing cases of all dimensions in the Exhibition grounds, also all things necessary for packing, such as paper, straw, hay, screws, and nails, &c., &c., on demand and at prices fixed by a tariff; and will undertake the packing of goods.

Note.—As the British Commission did this work previous to the close of the Exhibition, and were therefore entirely independent of these rules it will not be necessary to criticise them. Suffice it to say that these, like most of the other rules, appear to have been totally ignored by the parties concerned.

II.—*Dispatch by Rail.*

Dispatch of goods homewards or elsewhere by railway.

6. The General Direction of the International Exhibition, in conjunction with the directors of the railways abutting at Vienna, have determined the conditions by which the dispatch of the exhibited goods are to be regulated upon the close of the Exhibition.

7. The General Direction sets up an office in the Exhibition grounds, called the "Güter Expeditions Bureau," for forwarding the exhibited objects to be

* The German is ambiguous as to whether the exhibitor or the Bureau appoint the day.—"Translator."

dispatched by rail, to which office the commissions or individual exhibitors are requested to apply in all matters relating to the dispatch of goods by rail.

Consignments will not be received by the railways except through the intervention of the "Güter Expeditions Bureau."

Note.—It was principally owing to the strict maintenance of this rule that the Güter Expeditions Bureau was enabled to collect the manipulation charges so objected to by exhibitors.

8. The packed cases must be perfectly well-conditioned. Cases not hooped, or the sides and covers of which are too weak for their purpose, barrels not sufficiently hooped, or the bottoms, tops, or hoops of which are not thoroughly well secured, and bales not adequately sewn up, are liable to be rejected on delivery. Consignments that have been sent forward unpacked or inadequately packed for delivery, may be required to be packed or repacked in a better manner in case of need.

If the exhibitor or his representative considers such a precaution unnecessary, then, in pursuance of § 2/B of the traffic regulations of 1st July 1872, which are binding on the Austrian-Hungarian railways, the goods may be forwarded exceptionally, if the exhibitor or his representative acknowledges the fault or defective condition of the packing in a declaration over his signature to be recapitulated on the bill of lading. In this declaration the cases must be described and specified separately.

Marking the cases.

9. Each separate case must be marked with mark, number, and destination to which it is to be forwarded by rail, not on paper but on the case itself in black colour.

The foreign commissions are at liberty to indicate the nationality of their goods by the addition of a special mark.

They are requested to communicate this mark to the General Direction of the International Exhibition.

10. The numbering of the cases must be made in pursuance of § 30, Abs. III. of the general regulations for the department of the Austrian-Hungarian monarchies (No. 19), and of § 27, Absatz III. of the general regulations for the foreign department (No. 2). Cases with fragile contents which must not be roughly handled are to be specially marked. Old marks on the packages and tickets adhering to them of every description must be removed because they might give rise to mistakes.

Note.—Art. 8, 9, and 10, contain the A. B. C. of forwarding business and might well have been suppressed, at any rate as far as British exhibitors were concerned.

Form B 1.

11. If it is intended to take advantage of the reduction of tariff accorded to exhibitors, the exhibited goods must be accompanied, for Hungary and foreign countries, by a certificate of the respective Exhibition commissions, in duplicate, viséed by that of the forwarding goods office (Güter Expeditions Bureau) on white paper (Specimen B 2 of the Appendix), showing that the goods were exhibited, and are to be returned unsold to the original place of despatch, and to the original sender. One such certificate may only deal with the contents of one bill of lading, or in any case not more than the freight of one waggon.

Form B 2.

These certificates to be prepared in duplicate, of which one copy will be given up by the "Güter Expeditions Bureau" to the customs office at once, must set forth the quantity, marks, and numbers and contents of the cases, and the weight also in the case that that is known to the Exhibitor.

Note.—The Rule that on the certificate form B 2 should only be inserted the contents of one Fruchtbrief (respectively one truck load), could not possibly be complied with. These certificates had to be issued previous to the goods being loaded. How, therefore, was it possible to say that a certain number of packages of unknown dimensions would be contained in a truck of an unknown carrying capacity?

12. For goods that have been sold the full tariff charge has to be paid, and with them must be sent, for Hungary and foreign countries, a certificate of the respective Exhibition commission in duplicate viséed by the Güter Expeditions Bureau (on yellow paper), Form C 2 of the Appendix. One such certificate may only deal with the contents of one bill of lading, or in any case not more than the freight of one waggon.

Form C 2.

These certificates to be prepared in duplicate, of which one copy will be given up by the Güter Expeditions Bureau to the customs office at once, must set forth the quantity, marks, and numbers and contents of the cases, and the weight also in the case that that is known to the exhibitor.

Note.—The same rule as in Article 12, and specially impracticable.

13. Exhibitors have to fill up a bill of entry or specification of delivery of the exhibited goods prepared for despatch by rail, the contents of which must be arranged in precise conformity with the "return consignments" certificates (Rucksendungs Certificaten) mentioned above, because they will be used as models for drawing out the bills of lading.

The General Direction will prepare these on the annexed model, and have them distributed to exhibitors by the "Güter Versandt Bureau." Form D.

These specifications are to be brought in to the Güter Expeditions Bureau, where they will be entered in a journal, and the coupon detached from them will be returned to the exhibitor after weighing, payment of charges for cartage, &c. in the Exhibition (Manipulations-gebühren, § 16), and transfer of the goods. The said coupon will serve the exhibitor for an interim voucher that his exhibited goods prepared for despatch by rail have been put into the hands of the Güter Expeditions Bureau. The coupon will be exchanged in course against the certificate of lading (Aufnahmsschein).

Note.—An order for another set of certificates which appear to have had no other object than to subject exhibitors to the general system of administration.

14. The bills of lading will be drawn out by the Güter Expeditions Bureau on the model of the specification given in by the exhibitor (Form D.), and they will attend to the weighing of the consignments.

Note.—Had the Exhibitors been allowed to write their own bills of lading (as, in fact, they soon commenced to do in the British section), this document, if properly registered at the Evidenz Bureau, would, if it had not entirely obviated all other formalities, have gone far to do away with unnecessary clerical labour.

15. The exhibited goods cannot be dispatched subject to any charge of payment on delivery. No declaration of interest in prompt delivery will be admitted. The delay of transit admitted by the regulations begins to date from the date of the delivery of the goods at the Vienna station of the respective railway, or, as the case may be, at the Stadlauer station, where the bills of lading will be impressed with the seal of the forwarding office (Expeditions stempel).

The waggons loaded in the Exhibition grounds in the course of a day will be dispatched to the several railway termini on the same day.

Note.—Exempts the General Direction from all responsibility for delay of goods handed over to their care. The rule that full trucks were to be handed over and removed to the different railways on the same day of their being loaded was the exception. As a rule the goods met with great delay.

16. Goods that are not subject to compulsory prepayment of freight and charges may be sent in with charges either forward or prepaid. Prepayment of charges is to be made direct to the agency of the railway concerned in the Exhibition grounds. Exhibited goods can be taken upon the terms of the railway companies' reduced tariff not later than 31st March 1874.

17. The General Direction of the International Exhibition, who managed the unloading of the exhibited goods as they arrived on their importation by the railways, will also take charge of the reloading of the same on the railway waggons by the medium of the Güter Expeditions Bureau, and makes a charge for this (Manipulations-gebühr) according to tariff E. of the Appendix on all exhibited objects that are dispatched by rail. Form E.

Note.—Decrees the manipulation charges, but expressly states that the General Direction would do the work of loading for them. The manipulation charges were rigorously collected, but no services to speak of were rendered, as the British Commission did all their own work.

18. The Güter Expeditions Bureau of the General Direction of the International Exhibition takes charge of the clearing through the customs of con-

signments that are returned to the original sender and the original place of departure, in so far as this is to be done by declaration; all other customs arrangements must be carried out and the necessary customs documents produced by the Exhibition Commissions, individual exhibitors, or their representatives.

To avoid confusion at the close of the Exhibition it seems to be advisable that the clearing at the customs be made in good time, and that foreign goods which are destined to remain in the country (within the customs frontier) should be submitted to taxation before they are packed.

19. The certificates of lading (Aufnahmsscheine) of consigned goods may be withdrawn from the Güter Expeditions Bureau by the exhibitors or their representatives, against delivery of the coupons that they hold, so soon as the Güter Expeditions Bureau has received them from the railway company concerned, that is to say, immediately after the goods have been loaded.

But the certificates of consignments sent with prepayment of freight and charges are to be collected from the agencies of the respective railways established in the Exhibition precincts against delivery of the coupons and payment of the freight and charges.

20. On the basis of the above-mentioned bill of entry or specification of delivery the Güter Expeditions Bureau will give immediate notice to the railways interested at Vienna respecting the waggons required, and the railway companies will take pains to supply the waggons as quickly as possible.

These companies will communicate with the railways in connexion with them, and then give notice of the delay in which, after entry of the goods they can, as a rule, supply the required number of carriages for the different commissions or individual exhibitors.

But, whereas the number of waggons that can be loaded in the Exhibition grounds in one day is limited by the existing local conditions, the general direction of the International Exhibition will make such arrangements that the waggons daily placed at disposal by the railways shall be allotted in conformity with the rotation of the goods, entered and ready for loading, of the different commissions or individual exhibitors.

Note.—These rules were never complied with by the Austrian authorities. Trucks were never placed in the British section, and notice of their having been procured was therefore never given. No control on the equal distribution of empty trucks was ever exercised.

III.—*Despatch by the Imperial Royal Post.*

Sending home exhibited goods by the Imperial Royal Post.

21. Exhibited goods not too bulky nor exceeding 100 lbs. in weight but of any value may be given in at the Post Office in the Exhibition grounds for transmission to any place in this or foreign countries, subject to the charges provided by the postal tariff (Fahrposttarif); and, as to their nature, packing, and the documentary process, to the existing general postal regulations for internal traffic and the conditions of the postal treaties concluded with foreign countries.

Every despatch intended for transmission through the post must be passed through the Custom House before it is given in, and is to be dealt with in accordance with 22 (Forms G 1 and G 2.)

IV.—*Removal by the Ordinary Roads.*

Removal of exhibited goods by the ordinary roads, &c. Form F.

22. For the removal of exhibited objects which were brought into the Exhibition by hand, or in street carriages, and are to be taken away in a similar manner, certificates (on rose coloured paper), in Form F. of the appendix, will be supplied by the "evidenz-bureau" upon payment of any charges attached to the exhibitors or their representatives, in which the separate objects, the number and nature of them are to be specified.

After the proper official process at the Imperial Royal Custom House, the latter will impress a seal on one copy of the certificate which will serve as a pass.

23. *In the case of exhibited goods which arrived in the Exhibition by rail, and are not destined to be sent home by rail, removed in ordinary carriages or carried out, the exhibitors have to procure from the evidence bureau or, as the case may be from the respective exhibition commission a certificate,*

in forms G 1 or G 2 of the Appendix, on green paper, in which the separate objects, at least as to the number and nature of them, must be specified, and to present the certificate for inspection at the Guter Expeditions Bureau. After payment of any charges attached, and after the proper official process at the Imperial Royal Custom House, the latter will impress a seal on one copy of the certificate which will serve as a pass.

24. An undertaking sanctioned by the General Direction will, if required, take charge of the forwarding of goods from the Exhibition in ordinary vehicles, and on terms to be settled by agreement in each case.

The General Director,
FREIHERR VON SCHWARZ SENBORN.

FORM A.

International Exhibition, 1873, Vienna.

No.

Hall of Industry - - - - - -
Machinery Hall - - - - - -
Agricultural Court - - - - - -
Art Galleries - - - - - -
Park - - - - - - - -

Certificate of Identity.

The undersigned exhibition commission hereby certifies that Mr. is an exhibitor in group .

Signature of the commission.

Signature of the exhibitor.

Remarks.

1. Exhibitors will only be admitted for the packing and forwarding of exhibited goods upon production of this certificate.

2. The General Direction of the International Exhibition, in conformity with the General Regulations of 22nd January 1872, admits no responsibility for eventual damage or loss.

3. This certificate is to be produced at any time upon the demand of the officers of the General Direction.

4. The necessary tickets for the admission of assistants will only be granted upon production of this certificate in the office of the "Central Ordner."

5. For exhibited goods not intended for dispatch by rail, orders for passes will be granted by the Evidenz-Bureau against production of this certificate.

The undersigned authorises Mr. to pack and dispatch his goods in the Hall of Industry, Machinery Hall, Agricultural Court, Art Galleries, Park.

Signature of the person appointed,

Signature of the exhibitor.

FORM B 1.

AUSTRIA.

This certificate may not deal with more than one waggon load.

International Exhibition, 1873, Vienna.

No.

Return Consignment Certificate for Transmission by Rail.

The undersigned exhibitor hereby declares that the goods described below contain objects exhibited at the Vienna International Exhibition by Mr.

, which have remained unsold, and return to Mr. , their original place of departure, under the modifications of freight allowed by the railway companies.

Viâ

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Vienna, 1873.

Signature of the exhibitor,

Imperial Royal Customs.
(Seal and signature.)

For the General Direction of the International Exhibition, Vienna.
Eyidenz Büreau No

FORM B 2.

HUNGARY AND FOREIGN COUNTRIES.

This certificate cannot clear more than one waggon load.

International Exhibition, 1873, Vienna.

No.

Return Consignment Certificate for Transmission by Rail.

The undersigned commission hereby certifies that the goods described below contain objects exhibited at the Vienna International Exhibition by Mr. , of , which have remained unsold, and return to Mr. , of , their original place of departure under the modifications of freight allowed by the railway companies.

Viâ:

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Vienna, 1873.

The Exhibition Commission,

Imperial Royal Customs.
(Seal and signature.)

For the General Direction of the International Exhibition, 1873, Vienna.
The Güter Expeditions Bureau.

(On yellow paper.)

FORM C 1.

AUSTRIA.

This certificate cannot clear more than one waggon load.

International Exhibition, 1873, Vienna.

Return Consignment Certificate for Transmission by Rail.

The undersigned exhibitor hereby declares that the goods described below are objects exhibited in the Vienna International Exhibition by Mr. , of , that they have been sold, and are to be transmitted to the under-mentioned address.

Viâ :

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Address,

Value, florins.

Vienna, 1873.

Signature of the Exhibitor.

The Imperial Royal Customs.
(Seal and signature.)

For the General Direction of the International Exhibition, Vienna.
Evidenz Bureau No.

(On yellow paper.)

FORM C 2.

HUNGARY AND FOREIGN COUNTRIES.

This certificate cannot clear more than one waggon load.

International Exhibition, 1873, Vienna.

Return Consignment Certificate No. for Transmission by Rail.

The undersigned commission hereby certifies that the goods described below are objects exhibited in the Vienna International Exhibition by Mr. , of , that they have been sold, and are to be transmitted to the under-mentioned address.

Viâ :

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Address.

Value, florins.
Vienna, 1873.

The Exhibition Commission.

The Imperial Royal Customs.
(Seal and signature.)

For the General Direction of the International Exhibition, 1873, Vienna.
The Güter Expeditions Bureau.

FORM D.

One specification may not deal with more than one waggon load.

International Exhibition, 1873, Vienna.

Journal No. .
Magazb. No. . Vienna, 187 .

Bill of Entry or Delivery Specification

of the following exhibited objects from Mr. , in , to Mr. , in , railway terminus , delivered to the railway.

Mark.	No.	Quantity.	Packed in.	Contents.	Weight. Centners.	Weight. lbs.	Value.	Accompanying Documents.	Remarks.
									Entry of the above goods was made 1873. Delivered

Signature of the Exhibitor,

International Exhibition, 1873, Vienna

Journal No. .
Mag. B. Vienna, 1873.

Coupon.

Interim voucher
of the following exhibited objects from Mr. , in

Mr. , in - railway terminus, delivered
to the railway.

Mark.	No.	Quantity.	Packed in.	Contents.	Weight. Centners.	Weight. lbs.	Value.	Accompanying Documents.	Remarks.
									Entry of the above goods was made 1873.
									Goods taken over

For the General Direction of the
International Exhibition, 1873, Vienna.

The Güter Expeditions Bureau.

FORM E.

International Exhibition, 1873, Vienna.

Tariff

of the "manipulation" charges in the Exhibition grounds for the home or export expedition of exhibited goods for transmission by rail.

Details of the Manipulation Charges.	For cases weighing: Up to 15 Zoll centners.	From 15 to 30 Zoll centners.	From 30 to 50 Zoll centners.	From 50 to 70 Zoll centners.	Remarks.
	kr.	kr.	kr.	kr.	
For bringing out, weighing, and loading goods, and for the journey of the waggons to and from the Exhibition grounds and to and from the receiving lines of the North and Staatsbahn Railway, together per Zoll centner.	12	20	30	50	For cases of more than 70 centners weight, and for very valuable or uncommonly bulky objects, special agreement must be made between the Exhibition commission or exhibitor and the Guter-Versandt Bureau of the General Direction of the International Exhibition.
For Manipulation Office charges, for providing and maintaining the necessary arrangements for expedition in the Exhibition grounds during the period of loading the goods, together per Zoll centner.	15	15	15	15	
Total - -	27	35	45	65	

The General Direction of the
International Exhibition, 1873, Vienna.

(On rose-coloured paper.)

FORM F.

International Exhibition, 1873, Vienna.

No.

Certificate.

For Inland Goods.

The undersigned exhibitor hereby declares that the under-mentioned goods were brought in by waggon, exhibited in the Vienna International Exhibition, 1873, and are removed per waggon by Mr. , of .

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Vienna, 1873.

Signature of the exhibitor,

The Imperial Royal Customs.
(Seal and Signature.)

For the General Direction of the International Exhibition, 1873, in Vienna.
The Evidenz Bureau, No.

(On green paper.)

FORM G 1.

International Exhibition, 1873, Vienna.

No.

Certificate.

For Inland Goods.

The undersigned exhibitor hereby declares that the under-mentioned goods brought in by rail were exhibited in the Vienna International Exhibition, 1873, and are taken out per waggon by Mr. , of .

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Value.
					Zoll centners.	lbs.	

Address,

Value, florins .
Vienna, 1873.

Signature of the exhibitor,

Vidi,
The Güter Expeditions Bureau.

For the General Direction of the
Vienna International Exhibition, 1873.

The Imperial Royal Customs.
(Seal and Signature.)

The Evidenz Bureau, No.

(On green paper.)

FORM G 2.

International Exhibition, 1873, Vienna.

No.

Certificate.

For Foreign Goods.

The undersigned commission hereby certifies that the goods described below sent in by rail by Mr. , from , were exhibited in the Vienna International Exhibition, 1873, have been sold and will be taken away per waggon to the under-mentioned address.

Mark.	No.	Quantity.	Packed in.	Contents.	Weight.		Remarks.
					Zoll centners.	lbs.	

Address,

Value florins .
Vienna, 1873.

Vidi,
For the General Direction of the
International Exhibition, 1873, Vienna.

The Exhibition
Commission

The Guter Expeditions Bureau,

The Imperial Royal Customs.
(Seal and Signature.)

The perusal of these regulations will no doubt give an idea of the enormous and complicated work which was involved had the system laid down been literally carried into effect. They could not however be implicitly complied with, simply because in some instances they imposed impossibilities, and because the foreign commissions and exhibitors guided by their special knowledge of business and urged by the stern necessity to shift for themselves, being thrown on their own resources by the incapability of the contractor to perform the duty he had undertaken, soon found means to accomplish the work in a shorter and more practical manner without acting in opposition to the spirit of the instructions issued by the General Direction.

The authorities of the Güter Expeditions Bureau whose business it was to act as inter-mediators between the exhibitors and the contractor, and to levy the charges and dues imposed by the General Direction, soon saw the necessity of waiving some of the exceptional rules laid down in the above set of regulations, but did so only as regarded such conditions as compelled exhibitors to forward their goods through the General Direction's medium. To all regulations ensuring the due payment of the manipulation charges there was no exception made, and it must be acknowledged that they succeeded in preventing any goods from leaving their control before all the charges thereon were duly disbursed. This however, if it must be set down as one of the successful features of the business can hardly be considered to have worked satisfactorily, at least as far as England was concerned, as these charges were levied without any services being rendered.

The little work that was performed by the contractor was inadequately done, and goods handed over to his care almost invariably remained in the Exhibition untouched for an indefinite period of time, even if all the charges and formalities had been paid and conformed with. The difficulties were not a little increased by the necessity of clearing all the goods at the customs previous to forwarding the same from the Exhibition. To the honour of the officers of the Austrian Customs, however, be it said that in every instance they acted with the utmost liberality and that it was manifestly their constant endeavour to simplify matters as much as it was possible, consistent with the maintenance of a proper and just control.

As has already been shown in the report on the storage of empty cases the British Commission had profited by experience, and determined if possible to leave nothing concerning the interests of British exhibitors to chance.

Previous to the close of the Exhibition the number of English labourers was considerably increased, and on the third of November about 120 Italian labourers, mostly men who had been working for the Commission previous to the opening of the Exhibition, and who had therefore got accustomed to work under English foremen, were engaged for the purpose of effecting the removal of the goods.

This force was again as previous to the opening of the Exhibition divided into gangs, properly superintended and systematically employed to perform appointed duties.

The greatest obstacle to a speedy removal of the goods was the procuring of empty trucks. As will be seen from the regulations this had to be effected through the medium of the Güter Expeditions Bureau. Regularly every day the number of railway trucks required by the British Department was ordered at the above-named Bureau, but as regularly no trucks came in, and it was not long before the necessity to procure trucks from wherever they were to be found made itself painfully apparent, and this mode was therefore promptly adopted not only by the English Commission but by almost every other commission. This necessarily sometimes caused the interests of the different nations to clash, but it is satisfactory to place on record, that on all sides so much good humour and forbearance was manifested that these little differences never resulted in serious difficulties or ill-feeling.

The British Commission, with a view of thoroughly surmounting every difficulty, courted the co-operation of experienced men in the forwarding and Custom House business and succeeded in obtaining for the British exhibitors the greatest amount of assistance at the most moderate prices.

The Great Eastern Railway offered great facilities and low rates for the carriage of goods viâ Antwerp, and Messrs. Elkan and Head (a combination

of two trustworthy forwarding firms established in Hamburg and London) worked the return of goods viâ Hamburg.

Both these carriers sent out a staff of clerks thoroughly experienced in all matters concerning the transport of goods, and exhibitors making use of these routes were absolved from going through the complicated manipulations of the Güter Expeditions Bureau, which as before mentioned continued to levy the charges as if the whole work was done by their contractor; and were saved also the necessary formalities of clearing the goods at the Custom House.

To simplify matters still further an application was made and complied with, with great readiness by the Customs authorities for the establishment in the offices of the British Commission of a branch of the Custom House. This was a most beneficial measure, for although it did not entirely do away with the necessity of walking about one English mile (viz., the distance from the British Department to the Head Offices of the Customs, &c. and back) whenever goods had to be cleared or charges paid, all the necessary information and papers were to be obtained there, and when that bureau had been passed nothing remained but to obtain the final stamps of the Customs at head-quarters.

As no official statistics yet exist showing what part of the goods exhibited by England was returned, remained in Austria, or was sent to other countries, it is difficult to correctly estimate the amount of labour performed by the British Commission.*

It is however known that about 1,200 tons of English goods remained in Austria, and it is therefore nearly certain that almost all the other goods were worked out of the buildings and loaded into the trucks by the labourers of the Commission. It must also be borne in mind that the labour had to be performed under the most disadvantageous circumstances, as with the exception of the steam cranes, of which four were liberally supplied by Messrs. Appleby and one by Messrs. Powis, in the Machinery Hall, there were no appliances for lifting weights at the disposal of the Commission, so that everything had to be accomplished by primitive hand labour.

Towards the end of December the work was so far completed that the greatest number of labourers could be discharged, and at the same time nearly the whole staff of the Commission was enabled to return to England.

In fact the goods then remaining in the British section were mostly delayed owing to the respective owners not having taken any steps to cause their removal. Had this not been the case the section might easily have been cleared before Christmas.

In conclusion it is only just to state that the system of railway lines in the enclosures of the Exhibition was considerably improved by the construction of new sidings situated more close to the Industrial Building, and by the erection of permanent stages for the loading of agricultural engines and implements on wheels.

Transport of Objects of Art.

In consideration of the great value of the collection of objects of art exhibited by England, and the circumstance that the whole of it had been lent to the British Commission by the respective owners, steps were taken by the Commission to ensure great dispatch and safety in transmitting them to Vienna.

The collection was effected in covered picture vans lent to the Commission by the South Kensington Museum, which were sent for that purpose by rail or on their own wheels to the residences of the different owners throughout the United Kingdom.

Partly however the contributors to the collection packed their pictures, &c. themselves, and in such instances the cases were sent to the Commission in the usual manner.

When the Kunsthalle at the Exhibition was reported to be ready to receive the objects of art, a batch of four vans filled with pictures and statuary

* See, with reference to this subject, the table printed on page 91, which was received after the compilation of this memorandum.

was despatched from London to Vienna viâ Dover, Boulogne, Paris, and Munich.

Special arrangements were made with the South-eastern Railway and the different other carrying companies between London and Vienna, in virtue of which the vans received great attention and extraordinary care from the different officials on the road, and were forwarded to their destination attached to the ordinary passenger trains if that were necessary to prevent their delay. The vans were moreover accompanied by two men whose duty it was to see that they were handled with proper care, and that they were nowhere unnecessarily hindered.

Five vans followed the first batch shortly after, and also arrived without encountering the smallest mishap.

The passage from London to Vienna was performed in about seven days.

The collection was returned to London immediately after the close of the Exhibition in a similar manner, and towards the end of the year 1873, the different contributions were again distributed to their respective owners.

The Commission being responsible for the safety of these treasures of art ensured the entire collection at the value of *100,000l.* sterling at the average premium of 2 %.

The efficiency and safety of this mode of transport is sufficiently established by the facts, that the total damage on the collection amounted only to *350l.* sterling, or *6s. 6d.* %, and this for a group of statuary packed exceptionally by the artist and sent by rail: and that the time of transport was reduced to a minimum, the usual time of transport of goods from London to Vienna being about 14 days.

Report on the Storing of Empty Packing Cases.

The question how to dispose of the empty packing cases during the time of the Exhibition was one of serious importance, and seems to have been an object of special consideration of the General Direction of the Vienna Exhibition.

The facilities afforded by the General Direction for the storage of empty cases, consisted in a contract which was made with a company constituted under the style of "Verpackungs, Aufbewahrungs, Unternehmung."

To this company the monoply of the storage was accorded on the conditions that sufficient warehouse room should be provided at the charges of the following tariff.

Cubic Meter.	Storing Fee.		Surcharge for Repairs.					
			For slightly damaged Cases. I. Class.		For greatly damaged Class. II. Class.		For entirely broken Cases. III. Class.	
	Austrian Currency.	English Value.	Austrian Currency.	English Value.	Austrian Currency.	English Value.	Austrian Currency.	English Value.
	fl. kr.	*s. d.*	fl. kr.	*s. d.*	fl. kr.	*s. d.*	fl. kr.	*s. d.*
½	0 60	1 2½	0 10	0 2½	0 20	0 4¾	0 40	0 9½
½ to 1	0 80	1 7	0 15	0 3½	0 30	0 7	0 60	1 2¼
1 „ 1½	1 0	2 0	0 20	0 4¾	0 40	0 9½	0 80	1 7
1½ „ 2	1 20	2 4½	0 25	0 6	0 50	1 0	1 0	2 0
2 „ 2½	1 40	2 9½	0 30	0 7	0 60	1 2¼	1 20	2 4½
2½ „ 3	1 70	3 4½	0 40	0 9½	0 70	1 4¾	1 40	2 9½
3 „ 3½	2 0	4 0	0 50	1 0	0 80	1 7	1 60	3 2¼
3½ „ 4	2 30	4 7	0 60	1 2¼	0 90	1 9½	1 80	3 7
4 „ 4½	2 60	5 2¼	0 75	1 6	1 0	2 0	2 0	4 0
4½ „ 5	3 0	6 0	0 90	1 9½	1 15	2 3¾	2 30	4 7
5 „ 5½	3 50	7 0	1 10	2 2¼	1 35	2 8	2 60	5 2¼
5½ „ 6	4 0	8 0	1 30	2 7	1 55	3 1	2 90	5 9½

The managers guarantee for all cases, &c. received, with the exception of damages occasioned by natural events.

Applications for the return of the cases must be made at the office with an exact description of the place.

All charges must be paid, on the delivery of the cheque receipt, in advance.

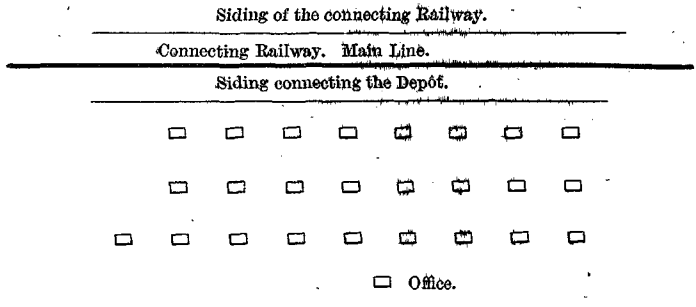
About two miles north-east of the Exhibition enclosures by the side of the line of railway connecting the Staatsbahn Nordbahn, and the Exhibition stations, twenty-five sheds of the following dimensions were erected,—

Length	- - -	120 feet.
Width	- - -	30 „
Heighth	- - -	18 „

affording a storage room of 64,800 feet per shed, total 1,620,000. These sheds were arranged in three long rows with a broad space or rather road between each of them.

This depôt was connected with the Exhibition, by the railway above alluded to, and this connexion, which was by a branch line, was the only railway accommodation provided for the storing company.

The following sketch shows the position of the sheds, and the railway arrangements :—



This railway accommodation, as will be seen at a glance, was inadequate, and the distribution of the sheds suggests that the original intention was to admit lines of railway between the rows of sheds, which if that had been carried into effect would have perfected, as far as possible, the whole arrangement.

As it was, the work had to be performed at great disadvantage, and the cases had to be carried considerable distances after having been discharged from the trucks. Separate sheds, or parts of sheds, were allotted to the different nations, and the cases were thus kept well separated.

At the disposal of the storing company were placed 50 open railway trucks with which to effect the collection and delivery, a labour which, considering the enormous pressure of traffic inside the Exhibition enclosures, and the confusion which reigned during the arrival and the dispatch of the goods was attended with the greatest difficulty.

As soon as the goods were unpacked the empty cases were turned out of the buildings, and the officials of the company labelled, took charge of, and transported them to the sheds at the earliest opportunity. There, as no time was to be lost, they were stored pêll-mêll, and not until the end of May could the work be commenced of sorting them into groups according to the different nations. About 300 men were kept constantly employed in doing this. The cases were spread out on a large field for that purpose, and thence carried to their different sheds.

The space occupied by England, the Colonies, and India, amounted to three sheds, *i.e.*, 194,400 feet.

The following number of cases were stored by—

England	- - - -	3,693
Colonies	- - - -	143
India	- - - -	479
	Total - -	4,315 cases.

The total number of cases stored by all the nations exhibiting was about 60,000.

The Royal British Commission anticipating the great difficulty in getting the empty cases returned to the different sections in the Exhibition resolved to take steps to ensure dispatch as far as the cases of England, India, and the Colonies were concerned, and for that purpose, with the co-operation of the storing company, but under the special supervision of their own officers commenced three weeks previous to the close of the Exhibition to sort their cases into three groups, viz. :—

Cases belonging to the Machinery Department.
" " Agricultural "
" " Industrial "

These groups were again sub-divided into minor groups according to the respective owners of the cases.

When this was carried out a number of railway trucks were hired on which as many cases as possible were stowed, and these remained outside the Exhibition enclosures ready to be placed in the respective sections as soon as the Exhibition was finally closed. As, however, a sufficient number of trucks were not furnished to carry this measure into effect thoroughly the Commission commenced a week before the close to transport the cases destined for the Machinery Department partly by cart and horse, and partly by carts drawn by Messrs. Aveling and Porter's and Messrs. John Fowler and Co.'s traction engines from the storing depôt to a depôt in the immediate vicinity of the Machinery Hall. This transport was attended with the greatest difficulty, as it had to be effected across two miles of a very sandy and uneven ground without even the vestige of a road. Notwithstanding this disadvantage, however, all the machinery cases were brought down before the 2nd of November, so that taking in consideration that the sorting had already been effected, and that about 30 railway truck loads were loaded, and ready to be placed in the industrial and agricultural sections, three-fourths of the work was done before the Exhibition finally closed.

During the three first days in November the work was continued with equal vigour and regularity, and the result was obtained that within that period of time all the cases stored for the British Department, India, and the Colonies were delivered in the respective sections, whereas the delivery of the cases of other nations occupied fully six weeks.

This result was obtained solely by the strenuous efforts of the Commission, seconded by the valuable co-operation of the contractors for the storage.

No co-operation was received from other sources; on the contrary, for "notwithstanding clause 1 of the Dienst Vorschrift which says, "On the "1st of November 1873 the return of goods from the Exhibition com-"mences," and clause 4, § A., in which it is promised that within the first three days after the close 450 truck loads (equal to a delivery of about 20,000 cases) would be delivered in the Exhibition, the railway lines had not even been put into working order again on the 3rd of November, the switches inside the Exhibition enclosures which had been disconnected during the summer months were not refitted, and it was not until a fortnight after the close that the lines were practicable, and even then new sidings were still in course of construction.

During the first days therefore the traffic could only be carried on the main lines, although in order to enable the trucks loaded with English cases to proceed to their departments, obstacles such as covered ways, &c., had to be removed by the labourers in the employ of the Royal British Commission.

The packing cases of the other nations as above stated were delivered in six weeks, *i.e.*, about 80 truck loads or 1,300 cases daily, whilst of the 450 truck loads promised to come in on the first three days only about 100 really were placed in the different sections.

As far as the contractors for the storage were concerned the delivery could have been effected in about four weeks, but it is understood that they received no co-operation from the authorities in charge of the railway arrangements.

In respect to economy and efficiency the system adopted by the General Direction must be considered to have left room for improvement.

The tariff of charges for storage is not very high, nor is the period of time in which the storage company performed the duty of collection and delivery long if the disadvantages under which the work had to be carried out are taken into consideration, but the facts recorded in this report on the other hand point to waste of time and labour, and on future occasions it should be made a matter of mature consideration to devise a system more generally advantageous, and in which the errors pointed out above may be avoided.

The commissioners of Germany, Holland, Russia, Italy, and Spain adopted the following system of forwarding goods to the Vienna Universal Exhibition :—

In two, three, or more large depôts stationed at central towns goods were collected and forwarded thence direct to the Exhibition. The exhibitors were charged a fixed rate per ton.

Probably without exception the transport taking place through the medium and for the responsibility of the Commission was sub-contracted for by large companies and carrying agents.

The responsibility of the carrying agents was in this manner borne by the Commission, although the Commission had very little control over and could influence only indirectly the proceedings of the carriers.

The system adopted by the Royal British Commission was totally different. Instead of undertaking the transport they left it to the individual management of each exhibitor, and made it their duty to collect reliable information regarding the different routes, the means of transport, the facilities offered, the rates of freight and carriage, and the time occupied in the transport, and to communicate this to the exhibitors who were then at liberty to choose for themselves with full knowledge of the circumstances; and, finally, through the courtesy of the Austrian Customs, an office specially for British exhibitors was established in the British Commission Offices.

A circular containing this was sent to exhibitors on the 11th of January, 1873.

The bulk of the goods was sent *viâ* Hamburgh, Bremen, Rotterdam, Antwerp, and Boulogne, and the cheapest routes were Rotterdam and Antwerp.

The total weight of goods sent by England for exhibition at Vienna amounts to 59,393 cwt.

The total number of truck-loads received was 955. The total number of packages received in the British section was 11,678. In the total of weight is not included 23 truck-loads of wood and other building material. These loads represent a weight of about 500 cwt.

The following statistics show the total number of packages, weight, and truck-loads received by all other nations exhibiting.

	Total Number of		
	Packages.	Trucks.	Cwts.
Austria-Hungary	57,341	4,537	259,520
Belgium	3,556	169	22,055
Brazil	381	6	846
Chili	14	1	20
China	715	19	1,216
Denmark	1,207	52	2,420
Egypt	227	26	1,305
France	11,527	1,048	67,136
Germany	47,508	2,556	181,740
Greece	326	15	1,311
Holland	1,339	44	2,705
Italy	9,509	437	27,004
Japan	2,032	86	5,415
Monaco	70	13	430

	Total Number of		
	Packages.	Trucks.	Cwts.
Persia - - - - -	96	5	146
Portugal - - - -	1,297	35	2,360
Roumania - - - -	410	21	938
Russia - - - -	3,295	458	27,493
Sandwich Islands - - -	6	1	11
Siam - - - - -	121	1	104
Spain - - - - -	2,092	31	2,407
Sweden and Norway - - -	3,562	223	16,831
Switzerland - - - -	3,425	259	18,432
Tunis - - - - -	116	6	248
Turkey - - - -	824	35	2,437
United States of America - -	2,321	81	6,670
Uraguay - - - -	35	3	.45
Venezuela - - - -	21	1	17

The General Direction of the Vienna Universal Exhibition made the following arrangements for the reception of the goods inside the enclosures of the Exhibition grounds :—Parallel with the principal buildings, viz., the Industrial, Agricultural, and Machinery Halls; four lines of railway were constructed, whereof those on the south and north side of the Industrial Hall were double and those on the south and north side of the Machinery Hall were single.

The total numbers of switches and turntables provided were :—

Switches, 25 ; turntables, 20.

10 turntables were on the interior lines and 10 on the exterior lines of the Machinery Hall.

The switches constituted the connexions between the main lines and the sidings, and were placed at considerable distances from each other; the turntables were only for the use of the Machinery Hall, and were therefore placed on the lines parallel and inside that building.

It was originally intended to discharge all the machinery inside the buildings, and to accomplish this two single lines of railway were laid down inside the building, connected with the lines outside at right angles, and having corresponding turntables.

The turntables, however, being of the smallest size, and only fit to turn ordinary railway trucks of a carrying capacity of about 5 to 7 tons, greatly decreased their practical value.

Nearly all the very heavy machinery, the carriage of which required larger trucks had to be discharged outside the building on the main line at great risk and to the constant impediment of the traffic, the only other entrances to the Machinery Hall being situated at the west and east end of the building, where the main lines were connected with the lines in the interior of the Machinery Hall by small and dangerously curved sidings.

To travel on these sidings, and especially on the one at the west end of the building, was at all times subject to great risk.

Trucks and engines, travelling at less than shunting speed, ran off the rails frequently, and a travelling crane endeavouring to proceed to its post along the western branch smashed two of its tyres in the attempt.

The admission to the system inside the enclosures was gained through only four entrance gates, all situated on the east side, with the exception of one, which, owing to its position, was almost entirely useless.

This gate admitted a branch of the Vienna connecting railway at the north-west part of the enclosure, and this branch joined the principal Machinery Hall line at about its centre.

Practically, only three entrances admitted the traffic to the Exhibition, and through this narrow channel also the returning empty trucks had to pass out,

Through this portal also the whole of the empty cases as they were turned out of the buildings and handed over to the contractor for the storage had to find their way to the storing sheds situated about one mile east of the Exhibition.

No provision was made for the removal of empty trucks and cases by a route independent of the mass of inward traffic.

Daily and hourly this inadequacy of all the railway accommodations provided, evinced itself in a series of blocks, stoppages, and delays.

Empty trucks remained on the spot where they were discharged, full trucks which, as very frequently occurred, were shunted on to the wrong lines, could not be brought back, and placed in the proper sections for days and sometimes weeks, and to complete the confusion, the buildings which ought to have been finished before the reception of the goods were for a great part still in course of construction, and the work of interior decoration was everywhere in full swing.

Bricks, blocks of wood, and other building material were strewn all over the railway lines, obstructing and endangering the passage, causing trucks and engines to run off the rails, and otherwise come to grief.

The great block of traffic which took place in the middle of April is to some degree owing to this, but also without doubt to the unfortunate procrastination of many of the exhibitors who did not dispatch their goods from England until the last moment; and the necessary evil arising out of the depôt system followed by other Commissions, in consequence of which large quantities of goods were accumulated and dispatched at one time.

The Exhibition buildings were thrown open for the reception of goods on the 1st of February 1873, but no goods came in, and it was not until the middle of March that the influx of traffic assumed any importance. At the first onset however the arrangements of the General Direction proved utterly inadequate and fallacious.

A good organisation of the railway service inside the Exhibition, though it could not entirely have forestalled the block, might possibly have prevented its assuming such enormous dimensions. The receiving stations at Vienna were overcrowded with Exhibition trains, from about the 1st up till the 15th of April about 2,000 truck-loads were standing on the different stations in and round about Vienna, which it was impossible to unload.

The whole traffic of the Kaiserin Elizabeth Bahn threatened to become interrupted, and the order was therefore telegraphed to Linz and Passau to detain the western traffic there, and only to dispatch to Vienna a certain number of trucks daily. The General Direction in their programme had undertaken the labour of unloading free of charges to the exhibitors. About 80 or 100 labourers (Italians, Dalmatians, Croatians, and Austrians) were assigned to do this work in the British section. These men were badly officered, inexperienced to the last degree, and totally devoid of even the most primitive utensils, and gear for moving weights. In a very short time it became evident that measures would have to be taken to ensure the opening in May.

It must be borne in mind that the British section was situated at the extreme end of the buildings, and that this was the most disadvantageous position as it was farthest removed from the railway entrances.

The British Commission towards the middle of March assumed the management of the unloading of goods in their own section. A staff entrusted with the management of the labourers placed at their disposal by the direction was organised. The force was divided into gangs headed by English foremen. These gangs were partly employed in shunting trucks loaded with British goods to their proper sections, and unloading the same whilst other gangs were kept regularly employed in working the goods into the buildings and distributing the different consignments to the space allotted to the exhibitors.

The cranes lent by Messrs. Appleby Brothers, of London, were kept in full activity in the Machinery Hall and rendered invaluable services. The traction engines and crane of Messrs. Aveling and Porter, of Rochester, also proved important auxiliaries, although the total absence of a proper road in the

Exhibition grounds, prevented the extensive use which could otherwise have been made of these practical little engines. The only thing left to the management of the General Direction as far as the British section was concerned was the supply of full trucks and the removal of the empty ones, but the supply was intermittent owing in a great degree to the block which pervaded the Continental system of railways; thus days passed without any full trucks coming in, while at other times the lines were so overcrowded that it was not possible to work to advantage. The months of March and April passed and the 1st of May found the Exhibition in a very unfinished state. The General Direction seeing that things were going wrong made an effort to remedy the evil, but instead of improving their railway service and ensuring regularity in the arrangements in and outside the enclosures, they tripled their force of labourers, which measure only tended to swell the expenditure without any commensurate benefit. At the commencement about 600 men were employed to discharge the goods, but when the traffic block occurred this number was suddenly increased to 1,800. If we look at the official reports regarding the daily delivery of goods at the Exhibition, and then consider the enormous number of hands employed to accomplish the work, it is not difficult to arrive at the tolerably sure conclusion that the average cost of discharging amounted to considerably more than the cost of working goods in England, which is only from about 1*s.* 6*d.* to 2*s.* per ton. Great energy was displayed before the opening ceremony, which, however, could not be termed a success. On the days following the work was resumed with renewed vigour and continued until the end of May, but even then some sections were not entirely ready.

Statement of Duties received in consequence of Goods cleared at the Vienna Exhibition.

Group.	—	Germany. Amount in German Weight.	Germany. Duty in Austrian Currency.	France. Amount in German Weight.	France. Duty in Austrian Currency.	England and India. Amount in German Weight.	England and India. Duty in Austrian Currency.	Remarks.
		pounds.	fr. kr.	pounds.	fr. kr.	pounds.	fr. kr.	
I.	Mining, Quarrying, and Metallurgy	424·14	560 39	306·26	142 44	157·17	12 12	Except the duties paid by English exhibitors on goods cleared at the Custom House of the Exhibition, different goods, especially machinery, were directed to other Custom Houses in Austria, for instance, Prague, Pesth, &c., to be cleared there. For these entries the amount of duty is estimated roughly at 3,000fl. The duties paid for account of the General Direction for material in the Industrial Hall and the Waterworks, which were constructed by an English firm, are,—
II.	Agriculture, Horticulture, and Forestry.	526·86	643 18	„	„	115·89	51 43	
III.	Chemical Industry	312·64	489 78	72·71	429 48	278·84	1,031 04	
IV.	Substances of Food as products of Industry.	145·02	2,560	302·62	2,009 47	387·97	2,187 86	
V.	Textile Industry and Clothing	304·20	2,570 20	71·05	1,147 74	259·03	3,276 09	
VI.	Leather and India-rubber Industry	51·00	356 55	37·28	155 85	39·42	259	
VII.	Metal Industry	606·00	1,892	1,566·11	6,317 51	1,269·04	3,007 76	
VIII.	Wood Industry	137·48	500	234·87	527 11	1,023·52	1,179 91	
IX.	Stone, Earthenware, and Glass Industry.	1,020·57	1,080 70	542·93	1,879 71	340·79	601 10	
X.	Small Ware and Fancy Goods	30·30	188	51·52	1,120 24	20·03	363 68	
XI.	Paper Industry and Stationery	25·78	75 80	14·21	55 8	15·62	44 12	
XII.	Graphic Arts and Industrial Drawing	17·60	31 80	4·13	5 79	„	„	
XIII.	General Machinery	15,689·50	22,297 70	3,074·69	4,529 13	12,071·59	19,897 64	
XIV.	Philosophical Surgical Instruments	44·53	400	11·31	276 54	9·50	32 50	
XV.	Musical Instruments	285·24	691 10	36·37	103 13	2·62	28 80	
XVI.	The Art of War	26·94	51 40	„	„	·10	1	
XVIII.	Civil Engineering, Public Works, and Architecture.	195·00	273 50	„	„	„	„	
XIX.	The Private Dwelling-house, its inner arrangements and decoration.	29·70	10 50	„		„	„	
XXII.	Exhibition showing the organisation and influence of Museums of Fine Art as applied to Industry.	·10	60	„		„	„	
XXIII.	Art applied to Religion	37·50	412 20	„	„	1,787·40	1,107 91	
XXIV.	Objects of Fine Arts of the past, exhibited by Amateurs and owners of collections (Exposition des Amateurs).	6·30	2 40	„	„	„	„	
XXVI.	Education, Teaching, and Instruction	12·80	32 20	„	„	„	„	
	Total	19,928·60	35,120 20	6,326·06	18,709 22	17,778·53	33,081 96	

Paid by—

	lbs.	f.
Jennings, IX.,	724,611	3,533·49×
Clark & Co., VII.	38,698	1,569·42×
Cooper & Holt, VIII.	460	27·60×
? ? XIII.	50,391	765·09×
	814,160	5,895·60×

There still remain here a few iron buildings of Hemming which have not yet been disposed of.

Arrangements for the Passenger Service.

When it was finally decided that the Government of this country should give its active co-operation to those British subjects who might be desirous of taking part in the Vienna Universal Exhibition of 1873, and a Royal Commission was appointed to further the object in view, one of the first matters which claimed their attention was the necessity which existed for securing on behalf of the exhibitors and their employés a reduction of the somewhat heavy fares ordinarily charged for the conveyance of passengers between this country and the Austrian capital. There was, it is true, good ground for supposing that, in view of the approaching Exhibition, considerable modifications would be made by the various railway companies in their then existing charges, since in so doing they would but be following the rule observed on previous occasions of a similar character; but it was felt that the reductions to be made in the case of ordinary passengers would not meet the case of those who, by reason of their connexion with the Exhibition, might, and probably would, be compelled to make several journeys to and from Vienna before the time at which such reductions would come into operation. As, moreover, the persons who would be sent out to take charge of goods and to act for their employers, either as agents or workmen, would be required to remain at Vienna during the whole period over which the Exhibition extended, it became evident that the ordinary return tickets, issued only for periods ranging from 30 to 45 days, could not, for this reason, if for no other, in their case be made available.

It therefore became necessary to consider how the requirements of the exhibitors in these particulars could best be met, and after duly weighing the facts of the case the conclusion was arrived at that the best course would be to arrange, if possible, with some one or other of the various railway companies for the supply to the Commission of return tickets, which might be again issued by them to the persons requiring them. The period for which such tickets should be available, if they were to be of any special value, ought, it was felt, to extend from the early part of the year 1873 to the close of the Exhibition, and they ought at the same time, in order fully to satisfy the purpose in view, to be sufficiently low in price to allow of two or three journeys being made without incurring any extravagent outlay.

These points having been settled, it remained to decide how best to arrive at an understanding with the railway companies, and after careful consideration, it was determined to entrust the conduct of the necessary negotiations to Messrs. Cook and Sons, the well-known tourist agents of Fleet Street, since their peculiar acquaintance with transport arrangements and the close relations existing between them and the different railway authorities both at home and abroad, seemed to render them in a special degree qualified to bring the matter to a successful issue. It became apparent that the course adopted was a judicious one, for Messrs. Cook were speedily in a position to announce that they had made arrangements with the Great Eastern Railway Company and the direction of the North German State Railways (Königliche Eisenbahn Direction), by means of which the journey to Vienna and back might be performed at a very moderate cost. The agreement was duly communicated to the Commission, and they received in a very short time from the opening of the negotiations a supply of tickets, which would fully provide for any calls that might be made upon them. These tickets were issued in two parts; those of the Great Eastern Company providing for the portion of the route between this country and Antwerp (via Harwich), and those of the German Company for the remainder of the journey, by way of North Germany, Leipsic, Dresden, &c. The prices of the double tickets were 9*l.* 17*s.*, 7*l.* 4*s.* 10*d.*, and 4*l.* 1*s.* 9*d.*, for the first, second, and third classes respectively, rates which, by comparison with the ordinary charges will be seen to be exceptionally low. Provision was made for the free carriage of luggage to the extent of 50 English pounds weight for each passenger, and it was permitted to break the journey as often as might be found convenient, provided that not more than eight days was occupied either in going or returning. The return journey, it was stipulated, should not be commenced later than eight days after the closing of the Exhibition.

A circular embodying this information and giving in addition particulars as to the route, the places where changes were to be made from one train to another, the hotels where beds might be procured, and other details which were likely to be of service to the traveller, was accordingly prepared and sent by the Commission to every exhibitor; but they refrained from specially advocating this line of route in preference to others, feeling that they had fulfilled their duty in simply pointing out the facilities afforded. A form of application was attached to the circular for the convenience of those who might desire to be supplied with tickets, it being pointed out, in accordance with the agreement made by the Commission, that they were only intended for the use of exhibitors, their agents and workmen, and that it would be necessary, in making application for them, to give a guarantee that the persons in whose names they were to be issued were going out in one or other of the capacities named.

The exhibitors were not slow to appreciate the value of the concession which the Commission had been fortunate enough to procure for them, as is evident by the number of tickets issued in each class, a list of which is given below.

When it is remembered that the route in question was somewhat longer than that usually followed, which has also by custom come to be considered as the established one, the figures are satisfactory, since they show that the length of time over which the tickets extended, and their very reasonable price, were advantages of which numerous exhibitors were only too happy to avail themselves.

NUMBER of TICKETS issued.

	1st Class.	2nd Class.	3rd Class.
Great Eastern - - - -	47	132	293
German State Railway - -	56	145	296

It will be seen that the number of the last-mentioned is slightly in excess of those of the Great Eastern Company. This is to be accounted for by the fact that it was open to the passenger to commence his journey at Antwerp if he desired it, and many who could not readily reconcile themselves to the long sea passage between Harwich and Antwerp or Rotterdam, were glad to take advantage of this arrangement.

It only remains to mention that at the close of the Exhibition, it was found that many ticket holders would be compelled to remain in Vienna, in order to provide for the return of their goods, for a longer period than the eight days allowed by the conditions under which their tickets had been issued. It accordingly became necessary to apply to the companies concerned for an extension of the time, which request was complied with, the date being extended, in the first place, to the end of November, and afterwards to the end of the year. The British Executive have to congratulate themselves that, owing to the comprehensive arrangements made, most of the British goods had been removed from the Exhibition building, and were on their way home before the date last mentioned, and that being the case, the exhibitors and their servants were no longer under any necessity to remain in Vienna, but were free to return to their own country whenever it suited their convenience to do so.

A letter is appended from Messrs. T. Cook and Son, the "General Passenger Agents of the Royal British Commission," which gives in somewhat more detail the arrangements they made for the advantage of British exhibitors and their assistants.

DEAR SIR, London, April 30th, 1874.

IN compliance with your request, we herewith give you, briefly, the particulars of the arrangements we had the honour to make, under our appointment by the Royal British Commission, on behalf of the Exhibitors, their Assistants, and Workmen.

Under the conditions of our appointment, we pledged ourselves to obtain from the Continental Railway Companies the best possible arrangements, upon the most liberal terms we could, for the conveyance of the Exhibitors, their Assistants, and Workpeople, and the Officials connected with the Royal British Commission, and we have great pleasure in recording the fact that we were able to obtain such concessions from the Continental Companies as were not granted to the Exhibitors, or to any other Commission respecting any nationality sending Goods or Exhibitors to Vienna.

We obtained from the Companies concerned an arrangement, under which the Royal British Commission were able to offer to exhibitors a return ticket starting from Antwerp to Vienna and back, at a single fare for the double journey.

We also, as agents of the Great Eastern Company, arranged with that Company to convey the Exhibitors, their Assistants, and Workmen, from London, or any Great Eastern station to Antwerp and back, at a single fare for the double journey.

The two tickets, viz., London to Antwerp and back, and Antwerp to Vienna and back, were made distinct and separate to meet the requirements of those who were absolutely compelled, or preferred the Short Sea Route to Antwerp, so that although the company interested in the Short Sea Route could not see their way to give the same facilities as the Great Eastern Company, still the Exhibitors were in a position to pay the ordinary fares to Antwerp, and then take advantage of the Exhibitors' ticket.

One of the stipulations between ourselves and the various Continental companies was that the tickets in question must be issued by you as Secretary of the Royal British Commission, so that there could not be the possibility of the tickets being used by the general public.

The fares at which the passengers were conveyed through from London to Vienna and back were first class, 9*l.* 17*s.*, second class, 7*l.* 4*s.* 10*d.*, third class, 4*l.* 1*s.* 9*d.*, and under these arrangements there were issued, first class 47, second class, 132, third class, 293, through from London by Great Eastern route; and in addition first class 56, second class 145, third class 296, starting from Antwerp, showing the relative numbers that took advantage of the arrangement to travel by the Short Sea Route.

From the fact that we have only received reports of *two* or *three* cases in which workmen returning from the Exhibition took the wrong route over certain sections, or through their misunderstanding the routes got into a train of a wrong class, we have the satisfaction of knowing that the arrangements made and carried out by us, worked as perfectly as it is possible for such arrangements to work on the Continent.

We suppose it is scarcely necessary in this report for us to refer to the fact that these arrangements were only obtained by us as the results of enormous personal labours on the part of our Mr. John M. Cook, and our German representative Mr. Osswald; and we are assured by all the railway administrators concerned, that the arrangements worked perfectly to their satisfaction, and that no similar arrangement was accorded to any other company.

With respect to the general arrangements for tourists, or the general travelling public, between England and Vienna, we have only to report that in the regular way of our business we made what we considered to be the most complete arrangements, embodying every interesting route, and compiling the coupons in such a manner as to give to the traveller the opportunity of either going the most direct, or most circuitous route, so enabling him to describe a circle, taking in any point of interest he might wish to visit in connection with his tour to Vienna; and we have the satisfaction of knowing that under our various arrangements we conveyed the great bulk of the English and American travellers.

Yours truly,
THOS. COOK & SON.

P. Cunliffe Owen, Esq.,
Secretary to the
Royal British Commission to the
Vienna Exhibition,
5, Craig's Court, W.C.

Memorandum to Mr. P. Cunliffe Owen on the Police and Sanitary Arrangements at the Vienna Universal Exhibition 1873.—By Mr. Inspector Hagen, of the Metropolitan Police.

Sir,

I respectfully beg to submit to you herewith a Memorandum upon the chief incidents which occurred in the performance of my duties while engaged on your staff at the Universal Exhibition at Vienna.

I entered on my duties on the 10th March 1873, having come over in charge of 11 men of the Royal Naval Reserve in the service of the Royal British Commission, and was at once put in communication with the heads of the police, customs, and military departments.

Workmen's cottages.

Before entering upon the subject of the Police arrangements connected with the opening of the Exhibition, I beg to leave to turn for a moment to the British workmen's cottages. The whole of the workmen connected with the Royal Commission and the men employed during the whole Exhibition by several of the British firms (60 in all) were lodged and boarded, and an additional number provided with English meals, in a marquee adjoining the two cottages.*†

Dinner marquee for laborers non-resident in cottages.

The maintenance of proper order and discipline in the cottages devolved upon me, and to exercise more effectual control I resided on the spot, and am happy to say that the conduct of the men generally rendered my duties much lighter than I could possibly have expected.

May I, however, be permitted to suggest whether, on any future occasion of the kind, it would not be advisable to separate the skilled artizans, engineers, &c., from the labourers, and to provide the two classes with separate tables at different charges; I am convinced by the experience of the last 10 months that such an arrangement would prevent many bickerings, which are otherwise sure to occur through the tenacity with which the higher paid men uphold their higher social claims.

Sanitary precautions.

Every home comfort and convenience was provided for the inhabitants of the cottages, which, while they excited the admiration of the numerous visitors from all countries and ranks of society, afforded a genuine English home to our people. It is, however, from a sanitary point of view that the cottages have abundantly repaid the care and labours in connexion with them. The closets and drains were daily disinfected, every drop of water was filtered before being used for drinking or cooking, hot and cold baths were at the service of the men, and fresh currents of air were made to pervade every sleeping room. The food was both wholesome and of the best description. Personal supervision was constant and searching, and the result was that during the whole of our stay we had not one serious case of illness among the residents in the cottages.

Epidemics in the city.

In July, August, and September every district of Vienna was infected with epidemics and disease. By direction of the Commission I made my daily rounds of visits to numbers of British exhibitors and workmen sick with cholera, typhus, small-pox, &c., living in various parts of the city. The British workmen's cottages were wholesome and healthy, and although a source of anxiety and care to the Commission they may be fairly considered to have been thoroughly successful.

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* These cottages were built and furnished at the expense of Sir Richard Wallace, Bart., M.P.

† The meals for the marquee dinners were cooked by an admirable contrivance named by the inventor, (Mr. Adams, of Strutton Ground, Westminster,) the "British Workman's Hotel." Shaped like a small locomotive, it contained an oven, boiler, tea-copper, and stove, and its cooking resources were amply sufficient for over 100 men, and as it was mounted on four wheels a pony could draw both it and the supply of fuel necessary for several days. Admirably adapted for street use, or where a large body of workmen might be congregated, it attracted much attention at Vienna, and may be thoroughly recommended for its practical convenience, portability, and economy of fuel.

Subdivided authority in the Exhibition

If while referring to the installation of the British department of the Exhibition I am occasionally found speaking of things beyond the general sphere of police duties, I may be permitted to remind you that owing to our knowledge of German and French both Police-constable Winkler and myself were fortunate enough to be more or less useful to the exhibitors whenever required, and backed by the influence and never-failing support of the Commission, we were able to settle the difficulties and troubles which were constantly arising. These occasions, inevitable to some extent in every undertaking of such magnitude, result to a certain extent from mutual want of knowledge, leading one side perhaps to an assumption of authority to which the other was unwilling to submit. Over sub-division of this authority, and consequent loss of time in determining the proper head to whom to refer, added at first to the difficulties; as time went on, however, by a mutual system of give and take, matters were quietly arranged, and the routine of business proceeded smoothly. Our difficulties in this respect would soon have become serious, considering the short space of time at our disposal; experience, however, speedily discovered the right way to act, and whilst we kept on the best terms with the head authorities, we were enabled to put on extra pressure where necessary. The orders of the Commission were carried out, and the necessary authority obtained afterwards. It is, however, only fair to add that I was enabled to pursue this course chiefly by means of the cordial and intimate relations existing between myself and the heads of the Exhibition police, Ober Commissare Steyskal and Revier Inspector von Pechmann, of whose support in any difficult case I was always beforehand assured. Some of our chief difficulties during the period before the opening were caused by the arrangements in force for the admission of exhibitors, workmen, and members of the staff. The divided authority came home to us on this point more than on any other, and whether the responsibility for those arrangements rested more with this person or that is not now of much importance, but there is no doubt of the fact that on each monthly alteration in the tickets of admission, it required a desperate struggle to obtain the number required for British exhibitors. Different places were appointed for the issue of the various classes of tickets, and as the arrangements were incomplete the work of distributing the tickets was allotted to one man which should have been given to many, and applicants who do not always estimate patience as a virtue became pressing, every one wishing to be served first. All this may in future Exhibitions be avoided by an alphabetical arrangement, so many letters to each clerk. Even you, Sir, have had your experience when on the night before the opening of the Exhibition the British Commission had not succeeded in obtaining a single ticket of admission either for exhibition workmen or staff, till late in the night you had to take the desperate step of fetching the General Director himself to assist the completely helpless staff with his energy and experience. All this must, however amusing it now seems, have proved a genuine cause of annoyance to those who had both to labour and to wait, and the complicated system of tickets which afterwards obtained might have been simplified by the adoption of the Paris plan of 1867, placing the photograph of the holder on the back of his ticket. Had this been adopted the annoyance of a monthly change of ticket would have been spared, the expense of a number of men at each turnstile would have been saved, whilst it would also have acted as an infallible check on dishonesty from within or without.

Ticket arrangements.

Dead-lock of staff night previous to opening.

System of check.

It was fortunate that the gatekeepers, relying on the complete control the British Commission had over its employés, were always willing, as far as we were concerned, to accept in any emergency your name as a passport for as many workmen as we required; but for this fortunate circumstance our task would have been far more difficult, both *before* the opening and *after* the close of the Exhibition, when, all experience notwithstanding, the regulations were still such as to compel a person who had business in all the departments to carry about him no less than 13 different tickets in order to prevent stoppages at every turn.

Pass arrangements.

The Reception of Goods.—The General Direction had conceded to Mr. Schneider the reception of the goods intended for exhibition and their

Reception of goods.

delivery to the different Commissions, but his staff added to that of the various railway companies was, however willing and active, scarcely numerous enough for its gigantic task. Blocking of the lines leading into the Exhibition was, in consequence, a frequent occurrence; and, as the result, goods urgently wanted were often for days in the immediate neighbourhood of the Exhibition, but unable to be got at, and quite as often, when at last they did get in, had they to be unloaded by our own staff. The "Verbindungsbahn," running through the suburbs of Vienna and connecting the termini of the different railways with one another, was also a source of great trouble and delay in the delivery of the goods. Many instances are in my recollection where valuable property anxiously expected after having safely arrived at the western, southern, or northern terminus, was for days lost to sight by being shunted about on the Verbindungsbahn. Indeed this portion of the work was a source of continual anxiety to the Commission night and day during the months of April and May; and it is only due to the example set by the British Commission to every one employed by it, that the British section was enabled to present on the 1st of May an appearance which gained the admiration of the General Direction and the Public.

Defective railway system.

In connexion with the reception of goods, I naturally come to speak of the Austrian Customs department.

Customs arrangements.

The Exhibition branch of this department consisting of about 150 officers was under the direction of Mr. Ober-Controllour Poeschl, a gentleman from whom, from first to last, I have received the most kind and considerate assistance; and it is with pleasure that I call to mind many instances in which, but for his kind efforts on my behalf and his readiness to accept the spirit rather than the letter, and red tape of the regulations of his department, I should have been often deterred and harassed by considerable difficulties. It was also evident that the tact and urbanity of the chief had its influence upon his subordinates, and previous to the opening as also during the clearing out, the utmost willingness and consideration was displayed by the whole of the custom-house staff.

Care of building.

The surveillance of the Exhibition grounds, buildings, and contents, was entrusted to police, military, and guardians. How far, however, each of these forces was responsible for the safety of the building, it would be somewhat difficult to define. By day they appeared to be on duty simultaneously, and by night, as I had occasion to point out in a former report, the interior of the building was left entirely unprotected, except that after the close of the doors a military patrol of six men made an inspection every two hours. But it appeared as if towards the close of the Exhibition the responsibility devolved more and more upon the police authorities; however, at any time it would, in the event of a great disaster, have been totally impossible to hold the chief of any one of the three forces responsible. That by chance everything passed off safely cannot blind us to the serious consequences which might have arisen from this instance of divided authority and responsibility.

Number of police.

The number of police employed, augmented from time to time during the preliminary preparations, was, from the 1st May to the 2nd November, 900 officers and men; they were posted in the courts and galleries from the hour of admission till the close, and in the grounds and at the different gates during the whole 24 hours. The duty was performed in reliefs of three hours each, one half being on duty, the other half off for that space of time.

Austrian police.

The police were posted at the gates in conjunction with guardians and check-takers, and it must be confessed to their praise, that while they carried out their duties with great firmness and decision, they did so also with great intelligence and discrimination. And here I take the liberty of reminding you of the readiness with which, on all occasions of small disputes with our workmen, the Austrian police took into consideration the different relations existing between the public and the police in England; and how they always abstained from enforcing from our men the extreme deference to authority, which is a particular feature in Austria. And there is no doubt that this considerate conduct of the police materially assisted us in our work at Vienna and prevented many little troubles which would otherwise have arisen. Of

the efficiency of the force it is enough to say that during the whole Exhibition only two small larcenies took place in the British department, in one of which the thief was discovered and convicted.

Military force.

The military force on duty at the Exhibition was a detachment of the Genie Corps (Engineers), 400 strong. Although they were on duty simultaneously with the police in the galleries, at the doors and in the grounds, their principal duty was the charge of the fire-engines and water service; and it must be admitted that on the few occasions of fire, and alarm of fire, which occurred during the Exhibition they were well up to their work. The third body of men, charged in conjunction with police and military, with the surveillance of the Exhibition and contents, were the guardians under the direction in chief of the Central Ordner Ritter von Maurer, assisted by a numerous staff of inspectors. The doors of the buildings and the entrances to the grounds were opened every morning at the appointed hour by the inspectors; and as they were in like manner closed and locked by them at night after the building had been cleared by the police, and the keys taken to the office of their chief, Ritter von Maurer, it would be perhaps right to assume that the Exhibition was in their charge during the night. The money and check-takers at the gates and entrances were also included in this body.

Guardians of Exhibition.

Number of visitors.

The number of visitors who paid at the doors exclusive of season ticket-holders amounted, according to the attached return, to 3,492,622, from whom the sum of 1,983,439 florins was received in payment.

The above numbers, averaging only 18,779 visitors for each of the 186 days of the Exhibition, are certainly far below what might have reasonably been expected. This was due, no doubt, to causes, some of which are beyond the zone of my observation, and respecting which I am not competent to form an opinion; but the fact is patent to every one that many causes were at work to seriously affect the number of visitors. I would point out chiefly the reckless rapacity with which, from the 1st of May, lodging-houses and hotel-keepers advanced their price at least cent. per cent., a proceeding which, when exposed by the foreign press, not only deterred intending visitors from far off countries, but, what was far more serious, prevented great numbers of the middle classes in Austria and Germany from undertaking the journey to which thousands of them had looked forward with pleasure. This is the more to be regretted as the social success as well as the financial interests of the Exhibition were thereby seriously damaged.

The above cause for a diminished attendance lies at the door of Vienna and its inhabitants; but there was another cause attributable to the same motives. This was the system of handing over the lavatories, chairs, and other conveniences for visitors to contractors who, having to pay enormous sums for their concession, naturally enough left no means untried to obtain as large as possible a return for their outlay; hence in the course of the first visit of a family to the Exhibition the charges on this account during the day would sometimes amount to a total which the purse-bearer would have to take into serious consideration before deciding on a second visit.

Exceptional charges.

The hardship of these imposts was felt nowhere more than in the picture galleries, where the charge for a chair was repeated again and again as a lady, or an invalid moved from one picture to another. When the complaints in this respect became too general, the example set by Great Britain of providing settees in our galleries was adopted by several other nations, and in a great measure put an end to these extortions.

The exorbitant charges for refreshments of any kind, obtained within the Exhibition might have been considerably reduced by decisive action, although it is to be feared that the high bonus paid by the bar-keepers for their concessions compelled them to adopt the enormous tariff, which after all did not appear in many cases to enable them to make their business pay.

Commission arrangements for clearing out.

When the Exhibition drew to its close the task of getting the British department cleared out in an expeditious and creditable manner, and to enable our exhibitors to return to their homes with the shortest possible delay, occupied the anxious consideration of the Commission; and it is not too much to say that the success which attended the endeavours of the Commission in this respect was a crowning proof of energy and determination.

The obstacles were formidable, it was necessary in the first instance to obtain for British exhibitors the empty cases which had been stored at a distance of several miles eastward from the Exhibition, the English department being in the westernmost part of the building; and it was evident that in the too probable event of a blocking of the lines by the cases of other countries, it would become almost impossible to convey the British cases through the whole length of the Exhibition grounds. Further it was a condition conceded by the General Direction to the company for storing the cases that the storage price for all cases was to be paid before delivery. Under these conditions to leave every exhibitor, or agent to obtain his own cases, would without fail, have ended in disputes and interminable delay, as it was decided that all goods sent away from the Exhibition had to pass through the Güter Expeditions Bureau, a concessioned institution similar to that whose performance at the reception of the goods left so much to be desired; and it was again evident that if left to deal single-handed with this office our exhibitors with their goods would not be likely to return to England very speedily.

Güter Expeditions Bureau.

Seeing clearly all these difficulties and obstacles, and finding that the General Direction were determined to compel a strict adherence to the regulation that no empty cases were to be brought into the Exhibition prior to the 1st of November, a special course of action, was taken with regard to English cases, and by the instructions of the Commission, strictly carried out by the staff, we were enabled to overcome all obstacles, and by Wednesday, two or three days after the closing, the whole of the cases were deposited in their places in the British section, and the British department was first at the clearing out as it had been first at the installation.

The first step was to pay in advance the whole of the money due for the storage, and repair of the cases, advising the exhibitors of the fact, and requesting them to repay the respective sums.

Payment of storage.

Being thus set right with the contractors for storing the cases, arrangements were made with them by employing their people under the direction of our officers, and the British Commission succeeded in this way in being the first to commence the removal of cases. A piece of waste ground, contiguous to our department of the Exhibition, being used as a depot, by the unremitting exertions of everyone concerned, with the valuable aid of the traction engines of Messrs. Aveling and Porter and Mr. John Fowler, we succeeded in removing during the last week of October the greater part of our 4,000 cases.

Delivery of Cases.

The first and most important step had thus counteracted the delay, which, as the sequel proved, was inevitable in the proceedings of the Austrian Güter Expeditions Bureau, by placing between that office and the British exhibitors two well known English carrying firms, the Great Eastern Railway, and Messrs. Head and Elkan. The goods, when packed, were collected by these firms into their depôts in the British department, trucks were hunted up by them, the goods loaded by their own men, the "manipulation dues" charged by the Güter Expeditions Bureau for imaginary work done by a staff of men, who never appeared on the scene, were paid under protest, and the goods forwarded with such expedition, that by the middle of December the British department was cleared out, the exhibitors had gone home, and the last members of the Commission staff were able to leave Vienna, their work finished, in time to spend their Christmas in England.

Carriers.

CHARLES HAGEN,
Inspector, Metropolitan Police.

ADMISSION by SEASON TICKETS, FREE PASSES, or PAYMENTS was obtained at the following entrances :—

The only entrance direct into the Exhibition. Elisabeth Avenue.

I.—WEST ENTRANCE, A.

Three doors.

No. 1. Exit.
„ 2. Entrance by tickets and payment.
„ 3. Exit.

II.—WEST ENTRANCE, B.

Three doors.

No. 1. Exit.
„ 2. Entrance by payment.
„ 3. Tickets and passes.

III.—SOUTH OR GRAND ENTRANCE IN HAUPT ALLÉE.

21 doors.

No. 1. For gardeners, &c. employed in grounds.
„ 2. Exit.
„ 3. Tickets and passes.
„ 4. Money changer's office.
„ 5. Entrance by payment.
„ 6. Closed.
„ 7. Closed.
„ 8. Exit.
„ 9. Entrance by payment.
„ 10. Exit.
„ 11. Entrance by payment.
No. 12. Exit.
„ 13. Tickets and passes.
„ 14. Closed.
„ 15. Closed.
„ 16. Exit.
„ 17. Entrance by payment.
„ 18. Money changer's office.
„ 19. Entrance by tickets and passes.
„ 20. Exit.
„ 21. Opened for gardeners, &c. only.

IV.—SOUTH-EAST ENTRANCE AT RONDEAU.

Four doors.

No. 1. Exit.
„ 2. Tickets and passes.
No. 3. Payment.
„ 4. Closed.

V.—NORTH ENTRANCE RAILWAY.

Six doors.

No. 1. Entrance by payment.
„ 2. Tickets and passes.
„ 3. Exit.
No. 4. Exit.
„ 5. Entrance on payment.
„ 6. Tickets and passes.

VI.—WEST ENTRANCE, C.—MACHINE HALL.

No. 1. Entrance by passes and tickets.
„ 2. Entrance by season tickets.
„ 3. Exit.
No. 4. Exit.
„ 5. Entrance by payment.
„ 6. Entrance by payment.

There are also 34 gates.

No. 1. Entrance for vehicles and carriers from 5 till 9 a.m. exit from 5 till 10 a.m.
„ 2*a*. Closed.
„ 2*b*. Entrance by passes; no exit.
„ 3. Open at night time only for passes.
„ 4. Closed.
„ 5. Emperor's gate.
„ 6. Closed.
„ 7. Closed.
„ 8. Closed.
„ 9*a*. Entrance by passes only.
„ 9*b*. For vehicles, carriers, &c. from 5 a.m. to 9 a.m.
„ 10. } Open during the cattle
„ 11. } show.
„ 12. Closed.
„ 13. For Railway purposes.
No. 14. For Railway purposes.
„ 15. For vehicles belonging to the general direction.
„ 16. For Railway purposes.
„ 17. Entrance by passes.
„ 18. For Railway purposes.
„ 19. } Closed.
„ 20. }
„ 21*a*. Vehicles, carriers, &c. from 5 a.m. to 9 a.m.
„ 21*b*. For entrance by passes.
„ 22. For Railway purposes.
„ 23, 24, and 25. Closed.
„ 26. For vehicles, carriers, &c. from 5 a.m. to 9 a.m.
„ 27, 28. Closed.
„ 29, 30. Entrance by passes at night time.
„ 31. Closed.

Places for Entrance and Exit.

For Tickets and payments	20
„ Exit	14
„ Gardeners	2
„ Money-changers	2
Closed	5
In all	43 doors.

34 Gates.

Closed	14
Vehicles	6
Passes	7
Railway purposes	4
Open during cattle and horse shows	2
Emperor's gate	1
Gates	34

EXTRACTS from Regulations as to Admission to the Vienna Universal Exhibition, 1873.

X. A weekly ticket costs five florins, available for seven consecutive days, seven coupons being attached to it. The holder of such a ticket may use one coupon a day, or may exhaust his seven coupons by allowing other persons to use them, provided always that one coupon is equivalent to one visit.*

XI. Weekly tickets will be issued on and after the 2nd May. They cannot be used, however, until the 4th May.

* Modified on several occasions concurrent with the general reduction of admission prices.

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XIII. The prices of admission are as follows:—On Sundays and holidays, 50 kreuzers = 1*s.*; on each of the other six week-days, 1 florin = 2*s.* The days of the opening, and of the distribution of prizes are excepted, the entrance price on those days being 25 florins = 2*l.* 10*s.* On the 2nd and 3rd May the entrance price is 5 florins = 10*s.*; and on the 4th May, 2 florins = 4*s.* A season ticket for the whole time of the Exhibition costs 100 florins = 10*l.* for a gentleman and 50 florins = 5*l.* for a lady. Tickets for ladies are, however, delivered only to those gentlemen who are already supplied with a season ticket.*

XVII. Each exhibitor of a collective exhibition is entitled to a ticket of free admission. Firms of two or more members can only claim one such ticket.

XVIII. Assistants, actually employed in the Exhibition, will be supplied during the time of their employment, with monthly tickets, at the price of 6 florins = 12*s.*†

XIX. Exhibitors who contribute to temporary exhibitors will receive free tickets available only for the time that such temporary exhibition lasts.

XX. The tickets for the jury and the experts of the jury will be available from the 1st of May to the end of August.

XXI. The President, the Vice-President, the Members of Foreign Commissions, as well as the representatives of the press, will receive honorary tickets of admission.

The General Manager,
SCHWARZ-SENBORN.

42, Praterstrasse,
Vienna, April 1873.

* The admission price of 1 fl. (2*s.*) on week days was reduced to 50 kreuzer (1*s.*)
On the 1st of May for Monday and Thursdays, two days.
„ 1st of June for Tuesdays and Fridays, four days.
„ 26th of June for Saturdays, five days.
„ 20th August for Wednesdays, six days.
All Sundays, with exception of first which was two florins, being 50 kreuzer days.

† This paragraph was never recognized by the British Commission or enforced in the British department.

COMPARATIVE TABLES of VISITORS to the UNIVERSAL EXHIBITION of 1873, and previous International Exhibitions. Compiled by HUGH WILLOUGHBY SWENY.

MAY.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	Thursday -	25 0	379	—	379	9,475 0
2	Friday -	5 0	1,000	10,137	11,137	5,000 0
3	Saturday -	5 0	1,005	10,346	11,351	5,025 0
4	*Sunday -*	*2 0*	*1,999*	*10,234*	*12,233*	*3,993 0*
5	Monday -	1 0	4,149	10,392	14,541	4,149 0
6	Tuesday -	1 0	11,990	12,631	24,621	11,990 0
7	Wednesday	1 0	9,516	11,887	21,403	9,516 0
8	Thursday -	1 0	5,354	9,414	14,768	5,354 0
9	Friday -	1 0	2,049	6,354	8,403	2,049 0
10	Saturday -	1 0	3,457	8,926	12,383	3,457 0
11	*Sunday -*	*0 50*	*20,663*	*10,275*	*30,938*	*10,331 50*
12	Monday -	1 0	3,788	9,059	12,847	3,788 0
13	Tuesday -	1 0	4,301	9,952	14,253	4,301 0
14	Wednesday	1 0	3,825	8,300	12,125	3,825 0
15	Thursday -	1 0	3,979	9,529	13,508	3,979 0
16	Friday -	1 0	6,721	11,508	18,229	6,721 0
17	Saturday -	1 0	7,141	10,204	17,345	7,141 0
18	*Sunday -*	*0 50*	*39,181*	*12,234*	*51,415*	*19,590 50*
19	Monday -	1 0	6,429	9,374	15,803	6,429 0
20	Tuesday -	1 0	5,697	8,085	13,782	5,697 0
21	Wednesday	1 0	5,567	9,175	14,742	5,567 0
22	*Thursday -*	*0 50*	*17,728*	*10,816*	*28,544*	*8,864 0*
23	Friday -	1 0	7,074	11,428	18,502	7,074 0
24	Saturday -	1 0	6,380	10,317	16,697	6,380 0
25	*Sunday -*	*0 50*	*38,113*	*12,202*	*50,315*	*19,056 50*
26	Monday -	1 0	8,083	12,409	20,492	8,083 0
27	Tuesday -	1 0	7,291	10,754	18,045	7,291 0
28	Wednesday	1 0	5,737	11,672	17,409	5,737 0
29	Thursday -	1 0	6,717	12,152	18,869	6,717 0
30	Friday -	1 0	6,132	12,897	19,029	6,132 0
31	Saturday -	1 0	7,616	14,513	22,129	7,616 0
			269,061	317,176	586,237	220,228 50

JUNE.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	*Sunday* -	*0 50*	*23,024*	*8,555*	*31,579*	*11,512 0*
2	*Monday* -	*0 50*	*69,262*	*16,450*	*85,712*	*34,631 0*
3	Tuesday -	1 0	17,725	17,138	34,863	17,725 0
4	Wednesday	1 0	14,156	12,246	26,402	14,156 0
5	Thursday -	1 0	15,827	19,000	34,827	15,827 0
6	Friday -	1 0	11,923	19,629	31,552	11,923 0
7	Saturday -	1 0	9,489	18,550	28,039	9,489 0
8	*Sunday* -	*0 50*	*55,167*	*18,401*	*73,568*	*27,583 50*
9	Monday -	0 50	23,913	12,841	36,754	11,951 50
10	Tuesday -	1 0	10,402	13,277	23,679	10,402 0
11	Wednesday	1 0	10,809	13,981	24,790	10,809 0
12	*Thursday* -	*0 50*	*37,203*	*14,142*	*51,345*	*18,601 50*
13	Friday -	1 0	12,431	13,163	25,594	12,431 0
14	Saturday -	1 0	11,122	14,782	25,904	11,122 0
15	*Sunday* -	*0 50*	*49,136*	*15,072*	*64,208*	*24,568 0*
16	Monday -	0 50	12,438	14,750	27,188	6,219 0
17	Tuesday -	1 0	30,615	10,808	41,423	30,615 0
18	Wednesday	1 0	11,643	14,654	26,297	11,643 0
19	Thursday -	0 50	34,477	14,601	49,078	17,238 50
20	Friday -	1 0	10,220	14,446	24,666	10,220 0
21	Saturday -	1 0	10,341	15,937	26,278	10,341 0
22	*Sunday* -	*0 50*	*42,436*	*13,518*	*55,954*	*21,218 0*
23	Monday -	0 50	28,036	13,826	41,862	14,018 0
24	Tuesday -	1 0	10,823	14,739	25,562	10,823 0
25	Wednesday	1 0	10,520	15,137	25,657	10,520 0
26	Thursday -	0 50	30,104	14,363	44,467	15,052 0
27	Friday -	1 0	9,768	14,841	24,609	9,768 0
28	Saturday -	1 0	8,652	14,207	22,859	8,652 0
29	*Sunday* -	*0 50*	*34,937*	*13,681*	*48,618*	*17,468 50*
30	Monday -	0 50	27,002	17,426	44,428	13,501 0
			683,601	444,163	1,127,764	449,828 50

JULY.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets, and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	Tuesday -	0 50	14,167	12,635	26,802	7,083 50
2	Wednesday	1 0	9,471	13,657	23,128	9,471 0
3	Thursday -	0 50	27,205	18,742	45,947	13,602 50
4	Friday -	0 50	15,192	21,411	36,603	7,596 0
5	Saturday -	1 0	9,079	14,164	23,243	9,079 0
6	*Sunday -*	*0 50*	*42,301*	*19,425*	*61,726*	*21,150 50*
7	Monday -	0 50	23,066	17,786	40,852	11,533 0
8	Tuesday -	0 50	17,896	18,188	36,084	8,948 0
9	Wednesday	1 0	9,012	15,151	24,163	9,012 0
10	Thursday -	0 50	23,515	22,329	45,841	11,757 50
11	Friday -	0 50	14,111	17,563	31,674	7,055 50
12	Saturday -	1 0	7,086	13,263	20,349	7,086 0
13	*Sunday -*	*0 50*	*27,294*	*16,650*	*43,944*	*13,647 0*
14	Monday -	0 50	21,232	19,195	40,427	10,616 0
15	Tuesday -	0 50	13,880	15,967	29,847	6,940 0
16	Wednesday	1 0	9,313	15,571	24,884	9,313 0
17	Thursday -	0 50	21,670	22,959	44,629	10,835 0
18	Friday -	0 50	15,250	18,890	34,140	7,625 0
19	Saturday -	1 0	6,886	17,667	24,553	6,886 0
20	*Sunday -*	*0 50*	*30,850*	*11,355*	*52,205*	*15,425 0*
21	Monday -	0 50	19,731	20,984	40,715	9,865 50
22	Tuesday -	0 50	16,684	20,105	36,789	8,342 0
23	Wednesday	1 0	7,350	14,431	21,781	7,350 0
24	Thursday -	0 50	18,000	21,875	39,875	9,000 0
25	Friday -	0 50	12,828	18,085	30,913	6,414 0
26	Saturday -	0 50	7,836	13,203	21,039	3,918 0
27	*Sunday -*	*0 50*	*25,747*	*18,281*	*44,028*	*12,873 50*
28	Monday -	0 50	16,402	17,762	34,164	8,201 0
29	Tuesday -	0 50	13,690	20,047	33,746	6,845 0
30	Wednesday	1 0	5,293	12,346	17,639	5,293 0
31	Thursday -	0 50	13,615	8,617	22,232	6,807 50
			515,652	528,313	1,043,965	298,571 0

AUGUST.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets, and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	Friday -	0 50	10,659	17,223	27,882	5,329 50
2	Saturday -	0 50	10,859	16,232	27,091	5,429 50
3	*Sunday*	*0 50*	*24,303*	*19,406*	*43,709*	*12,151 50*
4	Monday -	0 50	17,652	18,846	36,498	8,826 0
5	Tuesday -	0 50	14,953	18,686	33,639	7,476 50
6	Wednesday	1 0	5,343	11,712	17,055	5,343 0
7	Thursday -	0 50	14,656	18,831	33,487	7,328 0
8	Friday -	0 50	10,873	16,751	27,624	5,436 50
9	Saturday -	0 50	9,024	16,226	25,250	4,512 0
10	*Sunday* -	*0 50*	*18,112*	*16,488*	*34,600*	*9,056 0*
11	Monday -	0 50	16,354	19,600	35,954	8,177 0
12	Tuesday -	0 50	13,754	18,711	32,465	6,877 0
13	Wednesday	1 0	6,236	12,934	19,170	6,236 0
14	Thursday -	0 50	12,921	18,653	31,574	6,460 50
15	Friday -	0 50	24,514	22,270	46,784	12,257 0
16	Saturday -	0 50	14,437	18,464	32,901	7,218 50
17	*Sunday* -	*0 50*	*25,903*	*19,432*	*45,335*	*12,951 50*
18	Monday -	0 50	17,746	20,554	38,300	8,873 0
19	Tuesday -	0 50	14,516	19,231	33,747	7,258 0
20	Wednesday	0 50	18,585	23,605	42,190	9,292 50
21	Thursday -	0 50	14,423	18,859	33,282	7,211 50
22	Friday -	0 50	52,223	50,119	102,342	26,111 50
23	Saturday -	0 50	9,320	14,619	23,939	4,660 0
24	*Sunday* -	*0 50*	*23,339*	*16,406*	*39,745*	*11,669 50*
25	Monday -	0 50	16,677	18,351	35,028	8,338 50
26	Tuesday -	0 50	13,400	19,963	30,363	6,700 0
27	Wednesday	0 50	11,365	16,843	27,213	5,682 50
28	Thursday -	0 50	12,471	16,318	28,789	6,235 50
29	Friday -	0 50	10,056	14,412	24,468	5,028 0
30	Saturday -	0 50	10,307	15,463	25,770	5,153 50
31	*Sunday* -	*0 50*	*21,082*	*17,615*	*38,697*	*10,541 0*
			496,063	582,828	1,078,891	253,821 0

SEPTEMBER.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	Monday -	0 50	15,903	17,522	33,425	7,951 50
2	Tuesday -	0 50	14,229	18,047	32,276	7,114 50
3	Wednesday	0 50	12,491	21,494	33,985	6,245 50
4	Thursday -	0 50	13,560	19,448	33,008	6,780 0
5	Friday -	0 50	13,033	19,125	32,158	6,516 50
6	Saturday -	0 50	11,446	17,103	28,549	5,723 0
7	*Sunday -*	*0 50*	*35,066*	*21,846*	*56,952*	*17,533 0*
8	*Monday -*	*0 50*	*51,479*	*30,171*	*81,650*	*25,739 50*
9	Tuesday -	0 50	19,065	22,200	41,265	9,532-50
10	Wednesday	0 50	18,859	22,189	41,048	9,429 50
11	Thursday -	0 50	18,499	21,780	40,279	9,249 50
12	Friday -	0 50	15,559	20,185	35,744	7,779 50
13	Saturday -	0 50	13,849	18,682	32,531	6,924 50
14	*Sunday -*	*0 50*	*31,634*	*23,551*	*55,185*	*15,817 0*
15	Monday -	0 50	16,732	18,265	34,997	8,366 0
16	Tuesday -	0 50	13,694	17,113	30,807	6,847 0
17	Wednesday	0 50	17,521	23,915	41,436	8,760 50
18	Thursday -	0 50	22,628	24,285	46,913	11,314 0
19	Friday -	0 50	15,980	19,476	35,456	7,990 0
20	Saturday -	0 50	18,042	21,462	39,504	9,021 0
21	*Sunday -*	*0 50*	*42,058*	*26,720*	*68,778*	*21,029 0*
22	Monday -	0 50	30,271	25,272	55,543	15,135 50
23	Tuesday -	0 50	23,869	23,103	46,972	11,934 50
24	Wednesday	0 50	16,559	20,071	36,630	8,279 50
25	Thursday -	0 50	23,074	24,553	47,627	11,537 0
26	Friday -	0 50	21,702	22,556	44,258	10,851 0
27	Saturday -	0 50	18,072	21,622	39,694	9,036 0
28	*Sunday -*	*0 50*	*41,762*	*25,517*	*67,279*	*20,881 0*
29	Monday -	0 50	27,177	20,932	48,109	13,588 50
30	Tuesday -	0 50	17,706	18,726	36,432	8,853 0
			651,419	646,941	1,298,360	326,659 50

OCTOBER.		Entrance Fee.	Number of Visitors.			Amount received.
			Paid.	Cheap Tickets and Free Passes.	Total.	
		Fl. kr.				Fl. kr.
1	Wednesday	0 50	19,347	18,435	37,782	9,673 50
2	Thursday	0 50	16,727	17,930	34,657	8,363 50
3	Friday	0 50	14,831	18,910	33,741	7,415 50
4	Saturday	0 50	15,292	18,730	34,022	7,646 0
5	*Sunday*	*0 50*	*43,444*	*26,941*	*70,385*	*21,722 0*
6	Monday	0 50	20,480	20,671	41,151	10,240 0
7	Tuesday	0 50	20,985	20,955	41,940	10,492 50
8	Wednesday	0 50	19,560	19,659	39,219	9,780 0
9	Thursday	0 50	21,982	22,202	44,184	10,991 0
10	Friday	0 50	17,146	19,365	36,511	8,573 0
11	Saturday	0 50	16,597	19,467	36,064	8,298 50
12	*Sunday*	*0 50*	*47,245*	*30,386*	*77,631*	*23,622 50*
13	Monday	0 50	22,218	19,879	42,097	11,109 0
14	Tuesday	0 50	20,842	20,450	41,292	10,421 0
15	Wednesday	0 50	19,147	19,094	38,241	9,573 50
16	Thursday	0 50	16,125	17,488	33,613	8,062 50
17	Friday	0 50	17,530	19,317	36,847	8,765 0
18	Saturday	0 50	24,262	24,117	48,379	12,131 0
19	*Sunday*	*0 50*	*38,757*	*25,578*	*64,335*	*19,378 50*
20	Monday	0 50	25,859	19,468	45,327	12,929 50
21	Tuesday	0 50	23,198	19,799	42,997	11,599 0
22	Wednesday	0 50	23,761	21,880	45,641	11,880 50
23	Thursday	0 50	25,281	23,778	49,059	12,640 50
24	Friday	0 50	20,537	18,824	39,461	10,268 50
25	Saturday	0 50	19,706	19,676	39,382	9,858 0
26	*Sunday*	*0 50*	*44,017*	*28,592*	*72,609*	*22,008 50*
27	Monday	0 50	29,937	20,642	50,579	14,968 50
28	Tuesday	0 50	24,861	19,428	44,319	12,430 50
29	Wednesday	0 50	23,830	18,906	42,736	11,915 0
30	Thursday	0 50	24,118	19,926	44,044	12,059 0
31	Friday	0 50	18,693	17,116	35,809	9,346 50
1	*Saturday*	*0 50*	*47,761*	*28,951*	*76,712*	*23,880 50*
2	*Sunday*	*0 50*	*93,760*	*41,887*	*135,647*	*46,880 0*
			876,826	728,457	1,605,283	438,943 0

TOTAL NUMBER of VISITORS and AMOUNT received at DOORS.

—	Paid.	Tickets and Free Passes.	Total.	Amount.
				Guldens ks.
May - -	269,061	317,176	586,237	220,228 50
June - -	683,601	444,163	1,127,764	449,828 50
July - -	515,652	528,313	1,043,965	298,571 0
August - -	496,063	582,828	1,078,891	253,821 0
September -	651,419	646,941	1,298,360	326,659 50
October - -	876,826	728,457	1,605,283	438,943 0
	3,492,622	3,247,878	6,740,500	1,988,051 50
				£198,805 3
		From season tickets -		7,672 10
		Total - -		£206,477 13

TOTAL NUMBER of SEASON TICKETS.

—	Rate.	Number.	Amount.	
	£ s.		Fl. kr.	£ s. d.
Season tickets -	100 fl. = 10 0	425	42,500 0	4,250 0 0
Season tickets -	50 „ = 5 0	349	19,750 0	1,975 0 0
1 week - -	25 „ = 2 10	379	9,475 0	947 10 0
2 weeks -	5 „ = 0 10	1,000	5,000 0	500 0 0
			Fl. 76,725 0	£7,672 10 0

AVERAGE NUMBER of VISITORS at the different Rates of Admission.

No. of Days.	Price of Admission.	Average Number of Visitors each Day.	Average Money received daily.	
	£ s.		Fl. kr.	£ s. d.
1 Sunday -	2 fl. = 0 4	2,000	4,000 0	400 0 0
27 Sundays	50 kr. = 0 1	31,050	15,525 0	1,552 10 0
4 Saints' days	50 „ = 0 1	45,000	22,500 0	2,250 0 0
50 weekdays -	1 fl. = 0 2	8,590	8,590 0	859 0 0
101 „ -	50 kr. = 0 1	18,336	9,168 0	916 16 0

The highest number of visitors who paid on a florin day was 30,615, on Tuesday, 17th June, and the lowest 2,049, on Friday, the 9th May. The highest number who paid on a 50 kr. day was 93,760 on the closing day, Sunday, November 2nd, and the lowest 9,024, on Saturday the 9th August. The highest total number of visitors was on the closing Sunday, November 2nd, when 135,647 were present, and the closing scene was solemn in its very simplicity from the dense mass that

filled the vast space from the south portal of the Exhibition to the Haupt Allée. The next highest number was on the Exhibition Fête Day, Friday 22nd August, when the number amounted to 102,342; but the attractions were in the grounds, and the mass of visitors did not arrive till after the close of the Exhibition buildings. The Exhibition opened on Thursday the 1st of May, and closed at 4 p.m. on Sunday the 2nd of November, 186 days in all.

NUMBER of VISITORS and AMOUNTS received at TURNSTILES and by SEASON TICKETS at the FIVE GREAT INTERNATIONAL EXHIBITIONS.

	Number	Amount.
1851. LONDON. The "Great Exhibition" of 1851 was opened on 1st May and closed on 11th October, remaining open for payment 141 days in all. The three subsequent days from 11th October the Exhibition was open, admission was by free tickets to exhibitors and friends. The first day was exclusively for season tickets, no money being taken at the doors.	6,039,195	£ s. d. 424,322 1 0
Number of Days. / Entrance Fee. £ s. d. 2 — 1 0 0 28 — 0 5 0 30 — 0 2 6 80 — 0 1 0		
Greatest Number of visitors, Tuesday, October 7th, 109,915.		
1855. PARIS. The "Exposition Universelle" of 1855 was opened on 15th May, and finally closed on 30th November, a total of 200 days, Sundays included. Entrance Fee. Season tickets: Industrial department, 50 fs., 2*l.* Fine art, 50 fs., 2*l.* 5-franc days. 2-franc ,, 1-franc ,, 20 centime days (2*d.*). Sunday, May 27, free day. The Greatest Number of visitors on any one day was 123,017 on Sunday, 9th September.	5,162,330	128,099 8 0

Number of Visitors and Amounts received—*cont.*

——	Number.	Amount.
1862. LONDON. The "International Exhibition" of 1862 was opened on 1st May and closed on November 15th; total number of days open, 171 days. On the opening day, season tickets only were admitted, no money being taken at doors.		£ s. d.
Number of Days. / Entrance Fee.	6,211,103	408,580 1 8
£ s. d. 2 — 1 0 0 1 — 0 10 0 16 — 0 5 0 63 — 0 2 6 88 — 0 1 0		
The Greatest Number of visitors was on Thursday, October 30th, being 67,891.		
1867. PARIS. From 1st April to 3rd November. The "Exposition Universelle" of 1867 was opened on the 1st April and closed on the 3rd November, a total of 217 days, Sundays included, during which the Exhibition was actually open. Entrance Fee. Season tickets: From 20th January to close, gentlemen, 100 francs; ladies, 60 francs. From 21st July to close, gentlemen and ladies, 40 francs. From 8th September to close, gentlemen and ladies, 20 francs. From 7th April to close, weekly tickets, gentlemen, 6 francs; ladies, 4 francs.		
Francs. Entrance Fees — 2 50 " — 2 0 " — 1 50 " — 1 0 " — 0 50	8,805,969	420,735 7 2
These figures and amounts are exclusive of Billancourt.		

Number of Visitors and Amounts received—*cont.*

—	Number.	Amount.
Admission was obtained from the 18th December, 1866, by payment of 1 franc up to 10th March, 1867. The entrance fee on the 1st April was 20 francs; from 2nd to 7th inclusive, 5 francs; from the 8th to the close of the Exhibition it was invariably fixed at 1 franc at ordinary hours, and 2 francs from 6 to 10 a.m.; and after the close from the 4th to 21st November 1867 inclusive, the admission fee to the "Parc" only was 1 franc. The Greatest Number of visitors was on 27th October, being 173,923.		
1873. VIENNA. The "Universal Exhibition" of 1873 was opened on 1st May and closed on 2nd November; total of 186 days, Sundays included.		£ s. d.
Number of days. / Entrance Fee. 1 / 2 fl. 50 / 1 „ 132 / 50 kr.	6,740,500	206,477 13 0
Greatest Number of visitors on one day, Sunday, 2nd November, 135,647.		
Total Number of visitors, and the Amount Received at the Five Great International Exhibitions	32,959,097	£1,588,164 10 10

It may be thus said that "men in nations" have visited the Exhibitions of *the* nations; the total in round numbers of thirty-three millions exceeding the home population of our empire as taken at the last census, England and Wales and the small adjacent islands being set down in 1871 at an aggregrate of 22,856,904 souls, while Ireland may be roughly estimated at five, and Scotland at between three and four millions, in all not quite 32 millions, the balance, allowing only one half to be males, forming even in these days of monster armaments a formidable *corps d'armée*. The increasing influence of exhibitions amongst the masses may be best shown by the comparison of the greatest attendances at each exhibition.

"The Progress Medal," as it was termed in Vienna, for the greatest number of visitors in one day must be given to the "Exposition Universelle" of Paris in 1867, 173,923 having passed through the turnstiles on the 27th October, the Vienna display being a "good second" with 135,647 on the closing day, Paris in '55 coming next with 123,017, the Great Exhibition of '51 the extraordinary number as it was then estimated of 109,915, and London in '62 coming last with 67,891.

REPORTS.

Mr. WILLIAM ROBINSON.

BRITISH COLONIES AT THE VIENNA EXHIBITION.

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REPORT by WILLIAM ROBINSON, Esq., Special Commissioner for the Crown Colonies, and Superintendent of the Colonial Section at the Vienna Exhibition, 1873, upon the BRITISH COLONIES represented there, with particular reference to their PRODUCE.

BRITISH COLONIES.

Colonial Office, December 1873.

IT is to be regretted that out of more than 40 colonies only 11 should have been represented at the Vienna Exhibition. Doubtless this was partly owing to the short notice they received. It was not until July 1872 that a colonial representation was proposed, and it was necessarily a month or six weeks after that date before the colonial authorities were aware of the wish of Her Majesty's Commissioners that there should be a worthy display of colonial produce at an exhibition which was to be opened on the 1st May 1873.

The question to be considered at that advanced period was therefore not in what manner the colonies should participate, but whether it was then possible to make any representation at all.

It is now much more difficult to get exhibitors on any terms than formerly, when the exhibitions had the attraction of novelty; and the difficulties in the case of Vienna were increased in point of both expense and time, as compared with the exhibitions in the United Kingdom and Paris, in consequence of the greater distance.

If in Canada, for example, the intimation had been received earlier, there would have been opportunity of referring the question to Parliament, in order to enable it to consider the advisability of incurring the expenditure that would have been necessary for a fitting representation of that great dominion. But there existed the grave difficulty of want of appropriation for such an exhibition and also the insuperable practical difficulty of making the necessary adequate preparation and obtaining transport of articles to Vienna by the day specified. It was in view of the time required for preparations of this nature that the notices for the Universal Exhibition held in Paris in 1867 were given in 1865, and then, notwithstanding this early notification, it was found to be an arduous task in many colonies to be ready in time.

It would certainly have been highly advantageous for the Dominion of Canada to have been represented at Vienna, looking to the desirability of making its resources, products, and industry known on the continent of Europe, for the information of intending emigrants.

The above remarks, although perhaps in a less degree, are applicable to the cases of New South Wales, Western Australia, Tasmania, and some of the Eastern and West Indian colonies.

In one instance (Malta) the colonial government declined to contribute, on the ground of the expense incurred on their account at the Exhibition of Paris, which amounted to 1,086*l.* 14*s.* 7*d.*, without the attainment on the part of exhibitors of any approximate advantage for so heavy an outlay.

My entire expenditure at Vienna, where the commonest English labour cost 3*s.* an hour, on behalf of the six Crown colonies with whose interests I was especially charged, was considerably less than the amount spent by Malta in 1867, although the space occupied was perhaps five times as great. It is reasonable therefore to suppose that in future exhibitions the most economical course for the colonies to pursue will be to imitate the example set at Vienna by placing themselves in the hands of the British Commissioners for the time being, and agreeing to be represented by an official delegated by them for that service.

The numerous applications for samples of colonial produce which I received from continental firms, lead me to the conclusion that advantage will arise to the colonies far more than commensurate with the very trifling outlay which was incurred on their account.

I may here mention that samples of nearly all the raw produce were handed to the Minister for Agriculture, and that specimens of nearly all the fibres, woods, cotton, oil, cloves, coffee, and cinnamon, exhibited by our colonies, are now placed in the Polytechnical Institute, under the care of the eminent geologist, Dr. Hochstetter, where they will form the nucleus of a permanent British colonial exhibition in the capital of Austria. The necessity for sending full details, first, as to the approximate price on delivery in Europe of the articles exhibited, and second, as to the agents by whom they could be supplied, was very apparent. I frequently received applications for information on these points which I was unable to answer satisfactorily until after reference to London, and in some instances back to the colonies.

Difficulties of this sort need not arise in the future if the colonies exhibiting send to their agent an uniform schedule or catalogue of their goods in some such form as this :—

Article.	Exhibitor.	Approximate Cost of Delivery in Europe.	Agents in Europe.	Observations.	Directions.
Sugar - -	J. Jones -	24*s.* per cwt.	Smith, Bros., Mincing Lane.	Price can only be guaranteed from week to week.	To be sold.
Aloes fibre -	W. Giles -	30*l.* „ ton	„ „	—	May be presented to Museums.
Coffee - -	M. Renouf -	110*s.* „ cwt.	Roberts & Co., Lombard St.	—	
Palm oil	E. Banner-	5*s.* a gallon	„ „	Rise expected to 6*s.* immediately.	

Looking to the peculiar difficulties which had to be overcome owing to their remoteness, and to the short time in which the collections had to be made, it must be admitted that the colonies, and especially the Australasian colonies, made a most creditable exhibition, which much increased the interest and success of the British section. If, however, it is desired that in future exhibitions England's colonial empire should take a part commensurate with its great and ever-increasing importance, it is absolutely necessary that 18 months or two years' clear notice should be given in order to allow time for the preparation of an adequate display of colonial produce.

With these few remarks I proceed to endeavour to give effect to the wishes of Her Majesty's Commissioners, and trust that my report may be "advantageous to the colonies concerned, "of great interest to those who contemplate taking up their "residence therein, and also valuable as an official record."

BAHAMAS.

The colony called the Bahamas consists of a chain of islands lying between 21° 42′ and 27° 34′ N. lat., and 72° 40′ and 79° 5′ W. long. The group is composed of about 20 inhabited islands and an immense number of islets and rocks.

The principal islands are New Providence, containing the

BAHAMAS. capital, Nassau, Abaco, Harbour Island, Eleuthera, Inagua, Mayaguana, St. Salvador, Andros Island, Great Bahama, Ragged Island, Rum Bay, Exuma, Long Island, Crooked Island, Acklin Island, Long Cay, Watling's Island, the Berry Islands, and the Beminis. The Bahamas are remarkable in the history of the New World from St. Salvador having been first discovered by Columbus on his expedition of 1492, which was one of the greatest and most important ever undertaken. At that time they were filled with inhabitants who welcomed his arrival with pleasure and hospitality.

Early settlement. New Providence was settled by the English in 1629, and held till 1641, when the Spaniards expelled them, but made no attempts to settle there themselves. In 1662 these islands were granted by letters patent to the lords proprietors of the Carolinas, who had made special application for them to Charles II. They at once appointed a governor, who proceeded there. In 1667 New Providence was again colonized by the English, but it fell into the hands of the French and Spaniards in 1703, after which it became a rendezvous for pirates until they were extirpated in 1717, when a regular colonial administration was established, and the seat of government was fixed in that island. But with a view to this end it had become necessary for the Crown to appoint a governor, and in order to clothe it with this right a surrender was obtained from the heirs of the majority of the lords proprietors to the Crown of their rights in these islands. In 1727 an Order in Council was issued granting legislative privileges to the colony. In 1781 the Bahamas were surrendered to the Spaniards, but at the conclusion of the war they were once more annexed and finally confirmed to Great Britain by the Peace of Versailles in 1783. About this time, it being the conclusion of the civil war in the United States which resulted in their independence, a number of royalist families from Georgia and South Carolina settled in the Bahamas, taking with them their slaves, and establishing cotton plantations on some of the islands. Lands were granted them, and also important electoral privileges. Not long after the heirs of all the lords proprietors of the Bahamas formally surrendered their rights to the Crown. In 1848 the Turks and Caicos Islands were separated from the other Bahamas and placed under the government-in-chief of Jamaica.

There are 10 colonial custom-houses and ports of entry in the government of the Bahamas, viz., Nassau (the capital), *Abaco, Eleuthera, Harbour Island, Exuma, Rum Cay, Long Island, Long Cay, Inagua, and Ragged Island.*

CONSTITUTION.

Constitution.

Consists of a Governor, aided by an Executive Council of nine members, a Legislative Council of nine members, and a *Representative* Assembly of 28 members. The qualification of members is possession of an estate of real or personal property of the value of 500*l.*

PHYSICAL FEATURES.

Physical features.

The islands rise almost perpendicularly from an immense depth of water, and seem to have been formed from an accumulation of shells or small calcareous grains of sand. The land is generally low, and its surface throughout the islands is very nearly the same.

At a short distance from the shore a reef of rocks in many of the islands is observed to follow the direction of the land and form the boundary of the soundings. Without this rampart the ocean is often immediately nearly unfathomable; within it the bottom is either of a beautiful white sand, or chequered with rocks covered with seaweed.

GEOGRAPHICAL POSITION.

Geographical position.

The whole trade from North America and Europe to the Gulf of Mexico passes by the north of these islands. Steamers bound south stem the rapid current of the Florida channel. Sailing vessels pass between Abaco and Eleuthera, through the Providence channels, within 40 miles of Nassau, into the Gulf of Florida.

All the trade from North America to the eastern parts of the island of Cuba, to Jamaica, the Gulf of Honduras, and the northern coast of South America, passes southward to windward of the group and close to the shore of Inagua. The return trade and all the European trade from the same countries passes north, either through the Crooked Island passage or the Mayaguana or Caicos channels.

The Bahamas therefore lie in the track of two great streams of trade.

Area.

The total area of the 19 principal islands is 4,424 square miles. Andros is the largest, and contains 1,600 square miles. It is said to be the only one of the islands which possesses fresh water. In summer the thermometer generally ranges from between 75° to 88°, and in winter from 65° to 75°. The mornings are fresh and invigorating, and from the flatness of the islands the full benefit of the sea breezes is felt throughout every part of them. Hurricanes occasionally occur during the months of August, September, and October.

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Climate. The climate is most suitable to the growth of the cotton plant, and there is abundance of land available. The land produces healthy cotton plants for the first three years without manure, but with proper labour and judicious cultivation the plant would remain and flourish perennially. It is quite probable, supposing the value of cotton to be maintained at a high rate, that by the introduction of capital, labour, and an improved system of agriculture, crops equalling in quality those of the Southern States of America could be raised. An experiment was made in 1862 by the Manchester Cotton Association to encourage the cultivation and manufacture of cotton; but the "gins" sent out by that association did not answer expectation, as they only gained about 4 or 5 lbs. in the day.

Population.

In 1810 the population of the islands was -	16,218
In 1840 - - - - -	24,495
In 1861 - - - - -	35,287
And in 1871 - - - - -	39,162

The greater proportion of this population is employed in agriculture, some in producing salt, and a large number in fishing, sponging, and wrecking.

Produce. The principal produce consists of cotton, salt, sponges, conch and helmet shells, turtle, fruit, mahogany, dyeing and other woods, and bark.

Nothing can exceed the richness of the virgin soil under the shade of the primitive forests. But when deprived of that shelter and exposed to the air and summer rains, and used for purposes of agriculture, it soon becomes exhausted, and unless manured too poor to yield profitable crops.

The native forests abound with timber, the principal of which are pitch pine, fustic, lignum vitæ, mahogany, cedar, sabica or horse-flesh, braziletto, mastic, satin, logwood, and ebony.

Shipbuilding and manufactures. The building of ships and boats, the former seldom exceeding 100 tons, is carried on to a considerable extent. They are principally made from the woods to which I have referred. The only other manufactures are ropes, hats, baskets, &c., made from the palmetto, shell work, &c.

Woods. The demand for native woods as an article of export is annually increasing, and the manufacture of ornaments from turtle and other shells is becoming a lucrative employment.

Salt. The crystallization of salt is produced in six or seven of the islands. Early in the year, when the power of the sun begins to increase, accompanied with dry weather, the salt everywhere in the natural ponds crystallizes and subsides in solid cakes. It remains then only to break the crystals

and rake the salt on shore. The process is facilitated by making small pans, which, as the salt is taken out, may be replenished with brine from the ponds. BAHAMAS.

Salt to the value of 10,713*l.* was exported in 1872.

The total revenue and expenditure, imports and exports, for the last 11 years ending 1872 has been as follows:—

Revenue and Expenditure. Revenue and expenditure.

	£	£
1861	35,541	49,959
1862	39,356	41,832
1863	67,906	53,409
1864	102,024	98,636
1865	84,488	78,549
1866	53,283	76,985
1867	46,826	80,372
1868	40,777	68,306
1869	35,576	39,304
1870	40,710	47,270
1871	41,869	40,662
1872	37,574	38,836

Public debt, 1869, 54,161*l.* Public debt.

Imports and Exports. Imports and exports.

	£	£
1861	274,581	195,584
1862	1,250,322	1,207,755
1863	4,295,316	3,368,567
1864	5,346,132	4,672,398
1865	1,470,467	2,063,474
1866	328,622	261,972
1867	365,316	227,248
1868	231,526	131,522
1869	240,584	163,002
1870	283,970	190,253
1871	239,190	152,410
1872	201,051	136,224

The articles exhibited at Vienna, and to which it is my desire to direct special attention, were:—Wings of the flamingo, hawk's bill turtle, conch shells, shell and scale work, mimosa seed ornaments, fibres of plantain, banana, and pine apple; fans, hats, and ropes made of palmetto fibre, braziletto, ebony, mahogany, and sabica bark, and some fine samples of sponges. Articles in Vienna Exhibition.

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FLAMINGO.

Flamingo.

The bird more remarkable for its size and brilliancy of colour than any perhaps in the western world, and which is seen now principally on the most retired shores and swamps of these islands, is the flamingo. The birds are exceedingly watchful and timid, and it is nearly impossible to approach them. The young ones are nearly white. The feathers on the pinions and necks of the old ones are of a deep scarlet.

The naturalists describe the flamingo, called "Phœnicopteros" (a species of crane), as remarkable for its gentleness and mansuetude. The flesh is said to be extremely rich, and much like that of the wild duck, but with a strong fishy taste. A dish of flamingo tongues was esteemed by the ancients as a great delicacy. The feathers of the flamingo are used for making fans.

TURTLE.

Turtle.

On the quays or small sandy islets of the Bahamas turtle abound. The female turtle chooses the quietest and most unfrequented places for laying its eggs.

The back of the hawk's bill turtle forwarded to Vienna by Mr. Albury, which was most exquisitely polished, was one of the most prominent features on the Bahamas stall.

Of the three or four sorts of turtle that frequent the West Indies and Bahama islands, the hawk's bill alone affords what is commonly called the tortoise shell. The two other species, viz., the green and yellow or mulatto tortoise, have each of them such shells, divided into as many regular lamina, but they are so thin as not to be fit for use.

When taken alive they may be brought to shore and kept some weeks without any sustenance. Some part of the flesh is reddish when cut, and resembles coarse beef. Another is as white as a chicken's flesh, the fat being yellowish about the fins, and green (as every alderman knows) close to the upper and under shell.

The meat of the turtle is sold in the public market.

236 turtle and 12 cwt. of turtle shell were exported in 1872.

Tortoise-shell ornaments, consisting of necklaces, earrings, brooches, crosses, lockets, watch chains, &c., are largely made and extensively sold.

THE LARGE CONCH.

Shells and shell work.

This kind of fish is of two sorts, distinguished by the thickness or thinness of its shell. That with the thinnest

shell is generally the largest, and the other is most ponderous. The outside is of a brownish white, studded at uncertain distances with blunt knobbed protuberances.

The inside is finely polished, and its colour near the extremity of a pale red, farther in of a deep maiden's blush.

The head of the fish is guarded with a black horny beak; this being extended out of the shell and fixed in the sand, by a strong muscular motion drags the fish with its cumbrous weight of shell after it. It is thought that the conch feeds upon lesser shell fish, but outside the shell a fine whitish moss grows, upon which the fish often feeds, so that if it does rely upon other sources for sustenance, it always carries some part of its food along with it.

The broad-lipped conch has, as its name implies, a very wide mouth, with its lips much expanded. The first circumvolution of this takes up the greatest part of the shell.

The large brown conch is four inches long and about half as broad over the middle. The colour of this is of a shining brown, and the slit or mouth on each side is dentated.

The fish are eatable, being of a short, sweet, and luscious taste when fried. Conch shells of the value of 179*l.* only were exported in 1872, in 1857 the value of this export was 6,351*l.*

Part of the exquisite shell work which was shown at Vienna was made of the Concha veneris alba, which is not a quarter of an inch long. They are frequently called rice shells, and very much resemble that grain at a distance. The fish-scale ornaments are made of the scales of the bone fish, and Margate or market fish. The coloured scales are taken from the hog fish.

Among the articles now exported from the Bahamas may be mentioned conch pearls. They are sent chiefly to London. These pearls are found by the fishermen in some of the pink-lipped conchs, dived or picked up in the Bahama waters near the coast. They are afterwards taken to Nassau, where they are sold for exportation. The value of these pearls depends mainly, if not entirely, upon their form and colour. The form preferred is a perfect round or oblong, and the colour a light pink with a wavy surface. One of these pearls recently brought 80*l.* in the London market, but the price generally varies from 2*l.* to 30*l.* Many of the pearls which are exported are valueless from defects in shape or colour. Great care is therefore required in the selection of them. Some are purchased for the Paris market. These pearls are known in the trade as "perles de conque." I regret that no samples were sent to Vienna.

Pearls.

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MIMOSA SEED ORNAMENTS.

Mimosa ornaments.

The species of mimosa from which these very pretty ornaments are made is known as the "Jumba bean;" it is also called the wild tamarind. The seeds are of a ruddy brown. There is not much trade in this article.

PLANTAIN.

Plantains, &c.

The plantain tree in the opinion of many writers was formerly peculiar to Ethiopia only, but is now common in Asia, Africa, America, and the West Indies. The trunk is 25 to 30 inches in circumference round, tapering and undivided till about 9 or 10 feet high, at which height it puts out several large green leaves in an alternate order. These leaves are often 6 feet in length and 2 to 2½ in breadth, and of a long oval shape.

The trunk of the tree is of so pulpy a texture that it is often sliced away and given as fodder to cattle.

The fruit grows from the top of the tree in bunches of 30, 40, or 50 pounds weight. The most common method of using the fruit is to take them when green, though full grown, and bake or boil them, and when ripe to fry them in slices. It is one of the most useful fruits in the vegetable kingdom, and forms the entire sustenance of many inhabitants of tropical climes.

The banana differs only from the plantain in the greater height of its trunk, and in the difference of the size of its leaves and fruit, which are smaller.

It grows best under shelter or in a shady place. The fruit is fragrant to the smell and sweet to the taste; 6,793 bunches were exported in 1872.

Pine apples.

The chief export of the colony is the pine apple, which is grown in fields of large size and of considerable extent.

The cultivation of this fruit is carred on chiefly at Eleuthera, Abaco, and San Salvador, but the trees are also grown in some of the other islands. The first cargo of pine apples shipped to England was in 1842. A manufactory for preserving pine apples has recently been started by two American firms in Nassau. 494,213 cans of pine apples, valued at 8,190*l.*, were preserved and exported to the United States in 1872. There is good reason, however, to believe that in the present year, 1873, that quantity will be nearly doubled. The cans are made in the islands, and between 200 and 300 hands are employed in making them and preserving the fruit. *590,665 dozens of pine apples, valued at about 42,000l., were also exported in 1872.*

PALMETTO.

Palmetto hats, ropes, &c.

There are several species of the palmetto in the Bahamas. The leaves of one sort are extensively used by poor people for thatching their houses.

The leaves of another species are used for making common hats, baskets, brooms, and rope. These leaves are commonly called "top" leaves.

A third species finer than the other two is used for making fans, table mats, and handsome hats for ladies' wear.

The leaves are first dried, whether for thatching or manufacturing purposes.

The process of manufacturing leaves into hats is as follows:—*After the leaves are dried they are stripped into ribands of the size required and plaited, and the plaits sewn into the shape desired.*

Rope is made in the following manner:—The palmetto or top leaves having been gathered green and then dried are cut with knives into small thread-like strips. These are spun with a rude spinning machine into rope of which the outside is generally, though not always, covered with strips of leaves of about half an inch wide, with the view of making the rope more durable.

This kind of rope is very largely used by fishing smacks.

The fans are cut out of the palmetto leaf into the required shape, and the ornamental trimming is plaited and sewed on.

BRAZILETTO.

Braziletto.

This wood affords a beautiful scarlet dye. The Bahamas for many years before they had attracted permanent settlement were resorted to on account of this wood, which is most valuable, though few of the full-grown trees are now seen in the forests. The leaf of the Braziletto is small, ovated, and the twig extremely delicate.

MAHOGANY.

Mahogany.

The mahogany is remarkable for its good quality, but from its hard and knotty growth it is extremely difficult to work.

SATIN, SABICA, AND EBONY.

Satin, Sabica, and Ebony.

Excellent samples of these were exhibited, and attracted notice. There is a considerable demand throughout Germany for this sort of wood in the manufacture of workboxes and articles of furniture.

Whilst on the subject of woods it may be as well to

BAHAMAS.

mention another tree of remarkable note, which is famed for its durability and hardness. It is the mastic, or "Pistacia lentucus."

Woods exported.

The following were the exports of the principal woods in 1872:—

Braziletto - - -	25 cwt.
Ebony - - -	44 tons.
Lignum Vitæ - -	244 tons.
Logwood - - -	107 tons.
Mahogany - - -	2,525 logs.
Sabica - - -	12 logs.
Satin wood - - -	6,670 pieces.
together with Bark - - -	175 tons.

SPONGES.

Sponges are an important and valuable production of the Bahamas. They are found throughout the islands, but principally at Exuma, Andros, and Abaco.

The Bahamas sponge is considered to be inferior to the Mediterranean species. A number of persons are employed in procuring them, and they are obtained either by diving, or by detaching them from the rocks to which they adhere, by a sort of hook made for the purpose. There are seven classes of sponges, viz., the glove, glass, hardhead, mixed, reef, velvet, and wool. Very excellent samples of several kinds were exhibited at Vienna. In the year 1872, 2,790 cwt. of sponge, of the value of 18,831*l.*, were exported.

Exports, principal produce.

The values and quantities of the exports of the principal produce of the Bahamas, samples of some of which were exhibited at Vienna, were as follows in 1872:—

	Quantity.	Value.
		£
Pine apples - - - - - -	590,665 doz.	42,693
" preserved - - - - -	494,213 cans	8,190
Bark - - - - - -	175 tons	367
Sponge - - - - - -	2,790 cwt.	18,831
Conch shells - - - - -	—	179
Turtle - - - - - -	236	83
Turtle shells - - - - -	12 cwt.	753
Woods - - - - - -	—	1,779
Salt - - - - - -	630,414 bushels	10,713
Hides - - - - - -	772	240
Guano - - - - - -	465 tons	700
Bananas - - - - -	6,793 bunches	367
Oranges - - - - -	—	3,428
	Total value	*£88,323*

being considerably more than half of the entire exports from the colony for that year (136,224*l.*).

Wrecking.

No notice of the Bahamas could be considered complete without a reference to what is termed wrecking, or the salving of vessels and cargoes wrecked on or near the Bahama coasts. Owing to the vast trade which passes through or near the dangerous coasts of these islands, wrecks of vessels are frequent. The wrecking vessels are a class of fine fast-sailing schooners, many of them of beautiful models. They are generally built of native cedar, or horseflesh mahogany, of very durable nature.

The goods saved from vessels wrecked within the waters of the colony are of course liable to import duties, and therefore an income is annually derived from this source, formerly a large one, which, however undesirable, is nevertheless incident to the position of the Bahamas.

Although employment of this sort is certain to produce a hardy and daring race of seamen, it is, nevertheless, most liable to be abused, and some few years ago the Legislature, with a view of repressing any such abuses, and in the hope of diverting the attention of the population to the more profitable pursuit of agriculture, passed a law by which men engaged in wrecking are obliged to take out licenses. The Act also appoints wreckmasters, provides for the apportionment of salvage, and imposes penalties on wreckers for misconduct. The maritime portion of the community is now very fairly controlled by the operation of this Act, and it is to be hoped that the abuses which occurred in times past have ceased to exist.

Wages.

The average daily and monthly rate of wages in other employments appears to be,—

Masons, carpenters, and painters, 3*s.* to 4*s.*
Joiners, 4*s.*
Ship carpenters, 5*s.* and 6*s.*
Labourers, 1*s.* 3*d.* to 2*s.*
Cooks, 16*s.* to 20*s.* per month.
Domestic servants, 16*s.* to 20*s.* per month, with board.

General characteristics, temperature, &c.

Lying as they do in one of the most serene, genial, and (through a great part of the year) delightful climates in the world, and yielding by cultivation most of the vegetable productions of the temperate as well as of the torrid zone, it might seem strange that the Bahamas have not hitherto become generally settled; but from the intricacy of the navigation between them, as well as the natural unproductiveness, or rather deficiency, of the soil, these islands have

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attracted perhaps less notice than any other parts of the British empire.

Nassau, however, has become, for many years past, a winter's resort for those seeking to escape from the rigours of a northern to a milder southern clime. Many eminent American physicians strongly recommend such of their patients as may be suffering from or threatened with pulmonary disease to proceed to Nassau for the winter, in consequence of the mildness and equability of the temperature. With a view to attract such a class of visitors, a very commodious hotel, built on the American plan, was erected at the expense of the Government. The lessees of the hotel, Americans, are bound to conduct it like a first-class New York hotel. Ample and good accommodation has therefore been provided. Besides there are several excellent boarding houses. A line of well-built steamers, occupying three and half days in the passage, connect Nassau with New York every three weeks. This line carries the mails. Another line for passenger traffic only is about to be put on. Moreover, the Bahama Legislature have passed an Act providing for the payment of an annual subsidy to a company laying down a submarine *telegraphic* cable between Florida or Cuba and Nassau, so as to secure regular and rapid communication with the rest of the world. This object, it is believed, will be achieved in 1874, and will it is thought, be the means of attracting still more visitors to Nassau.

The principal portion of the Bahamas exhibits have been presented to the Queen's College Museum at Cork.

CAPE OF GOOD HOPE.

CAPE OF GOOD HOPE.

In 1486 Bartholomew de Diaz, a Portuguese commander, sent out by King Henry of Portugal in search of India, discovered the Cape of Good Hope, and on the 14th September in that year anchored in Algoa Bay. For many years it was resorted to by Portuguese, Dutch, and English navigators. In 1620 the English took possession of it. In 1652 the colony was settled by the Dutch East India Company under Van Riebeck. It remained in the possession of the Dutch till 1795, when it again reverted to the British, but was ceded in 1802 to its former possessors. In 1806 it was again taken by the English, to whom it was confirmed at the general peace of 1815.

Strictly speaking the Cape of Good Hope is a small promontory near the south-west extremity of the continent of

Africa. But the extensive colony of that name is washed by the Atlantic and the Southern or Indian Oceans on the west and south, is bounded on the north by the Gariep or Orange River, and on the east by Kaffirland, including what was formerly the colony of British Kaffraria. The Cape colony contains an area of about 119,662,000 acres, of which 62,697,958 are disposed of. In 1871 Basutoland was formally annexed to the Cape. In consideration, however, of the peculiar circumstances of the Basuto community, the incorporation of the country was expressly declared not to render it subject to the general law of the colony; but its affairs are for the present administered by the governor, who has appointed an agent and resident magistrates in the territory, and reports annually to parliament all proceedings taken by him in respect of its government.

CAPE TOWN.

Cape Town.

According to the Guide Book of the Cape, an excellent work which is published by G. Street, Cornhill:—

"The city of Cape Town (the capital) is built on a gradual slope, bounded on its northern extremity by the waters of Table Bay, and rising to and almost completely enclosed on the east, south, and west by a mountainous cordon, consisting of the Devil's Mountain, Table Mountain, and the Lion's Head and Rump Mountain.

"From the anchorage of Table Bay the town with its white houses and dark mountain background presents a very novel and inviting aspect, the effect of which is by no means diminished when visitors by sea, upon landing at the central jetty and proceeding up the principal street, enter the fine oak avenue of the 'Government Walk,' and then passing through its length into the street beyond see before them the majestic proportions and wall-like front of the north side of Table Mountain.

"The Government Walk, or central avenue of the Government Gardens, is about three quarters of a mile in length, and is the principal foot thoroughfare to the numerous better class residences in Table Valley. In the same enclosure to the right of the main avenue is situated the St. George's Grammar School, the fine building in which the public library and the museum are located, the Botanic Garden, and the South African College. On the left is the St. George's Industrial School, and Government House and Gardens.

CAPE OF GOOD HOPE.

" 'As the seat of government and the capital of the 'colony, Cape Town is the centre of all the public business 'of the country. It has lately, more for political than com- 'mercial reasons, been connected by telegraph with Port 'Elizabeth, Graham's Town, King William's Town, and 'intermediate places. It is the centre, too, of the export 'and import trade of the whole western province to and 'from foreign countries, and also carries a considerable coast 'trade with Hondeklip, Walvisch, and other bays on the 'west coast, and Mossel Bay, Port Elizabeth, Port Alfred, 'East London, and Natal on the east coast. Its principal 'exports are wool, copper ore, hides, horns, ivory, and ostrich 'feathers to England and other foreign countries, fish to 'Mauritius, and corn, wine, and brandy to the eastern 'province, British Kaffraria, and Natal. The facilities of 'communication both by land and sea have been of late 'very much improved. Fine steamers run regularly to and 'from England, and to and from Mauritius, Natal, and 'intermediate ports. A railway runs out of town nearly '60 miles into the country, through the most densely popu- 'lated and productive districts. Fine roads scaling the 'loftiest mountain ranges connect it with remoter divisions, 'draw towards it all the produce of a very great extent of 'country, and enable it to send back imported supplies to 'satisfy the needs of all with a despatch which was never 'dreamt of a generation ago.'"*

Govern- ment.

The government of the Cape from 1806 to 1835 was administered by a governor, aided by a few executive officers; but in that year an Executive Council and a Legislative Council, appointed by the Crown, comprising certain office holders and some unofficial members, were created.

Responsible government was introduced in November 1872.

Diamonds.

The discovery of diamonds on the Vaal River, near the northern boundary of the colony, confirmed beyond the possibility of a doubt early in 1869, has led to a large immigration, and to the formation of extensive settlements in West Griqualand, where many thousands of persons are now engaged in actual digging operations and in trade. By proclamation of the 27th October 1871, it was notified that Her Majesty had accepted the proffered allegiance of the Chief Waterboer and his Griquas, and that their territory,

* *From the text to Mr. Bowler's Views of Cape Town, written by the late Mr. W. R. Thomson, and published by Mr. Juta, Cape Town.*

as defined by previously existing treaties, was constituted a part of the British dominions. CAPE OF GOOD HOPE.

Railway works between Port Elizabeth and Uitenhage, and between Wellington and Worcester, are now being carried on, and other lines both in the eastern and western districts have been authorised by parliament and are already in progress. Railway works.

The climate of the Cape is very favourable to people of European birth; the temperature at Cape Town, according to tables compiled from careful observations during 20 years made by Sir Thomas Maclear, the astronomer royal at the observatory, is shown to be less variable than in most countries; the average temperature in winter was but 14° 86′ below that of summer, the mean temperature was 61° 88′, the highest was 96° 80′, the lowest 37° 70′. The summer may be said to begin in November and last till April, when winter commences. Climate.

The climate is therefore without violent changes from heat to cold, and experience has proved that the early symptoms of consumption have been entirely eradicated by residence in the colony.

The surface of this extensive country is intersected by considerable mountain chains whose mean average of elevation is from 1,000 to 4,000 feet, some peaks attaining to 9,000 feet, and perhaps in one or two instances more. Physical features, &c.

Much of the soil is excellent, but water is very scarce, especially in the eastern province and the Orange River free state, the great pastoral portions of the country.

Nearly all the rivers of the colony have the characteristics of wild torrents, drying up almost entirely at times, or leaving only shallow pools of brackish water.

The coast is indented by several bays, namely, Table Bay, False Bay, Mossel, Algoa, and Waterloo Bays.

In the western province the south-east winds blowing off the land produce drought, and the north and south-west winds in the winter bring rain and moisture. In the eastern province it is just the reverse, the summer and south-east winds bring moisture and rain; it is from this reason that the western province is to a great extent the agricultural, whilst the eastern is the pastoral division of the colony.

Vegetation is rich and various, and somewhat similar to that of Australia, though the gum tree, one of the prominent features of the Australian flora, is wanting at the Cape. Vegetation.

The cultivation of wheat, though extensively practised, is Occupations of settlers.

CAPE OF GOOD HOPE.

impeded by want of moisture, and also by effect of blight or rust.

The division of Somerset contains some of the finest pasturage in the colony, and its cattle and sheep are bought by traders from all parts. It is well adapted for woolled sheep, of which there are many large and valuable flocks.

The grazing grounds of the Cape are not, as a rule, grassy plains, but consist of large tracts of country covered with aromatic bushes and bushmen's grass, upon which the sheep thrive amazingly. These bushes and grasses appear to be deep rooted, and consequently the long droughts otherwise destructive to vegetation have no injurious effect on them, and they recover their verdure in a few days after rain.

Sheep farming may be said to be the principal and most lucrative employment of the colonists, and it is an occupation which is extending in all the districts of the colony; it is not entirely confined to the white population, for in the district of Calvinia, as well as in others, some of the natives have small droves of sheep and goats, or of cattle. The Government encourages them to attend to their flocks, and thus they are induced to lead peaceful and honest lives. The largest farmers are descendants of the original Dutch colonists. They are a steady, thrifty, and energetic race, and largely predominate amongst the white inhabitants.

In addition to sheep farming, the settlers are employed in the production of wine, in the breeding of horses and cattle, and in the growth of wheat, barley, and maize. The wheat, although, as before observed, liable to injury from drought, blight, and rust, is frequently of such a quality as not to be surpassed by any grown elsewhere. Ostrich farming, to which reference will be made later on, is also engaging the attention of the colonists.

All kinds of fruit introduced from Europe grow in abundance.

Situated midway between Europe and Asia, and also between England and Australia, the Cape of Good Hope occupies a position of considerable maritime importance. In addition to upland soil, park-like downs, and sheltered valleys, it affords suitable temperature for endless varieties of culture. The vine, cotton, tobacco, olive, and mulberry flourish. Gold and copper and diamonds in large quantities have been discovered, and there are indications of coal in parts of the colony.

Possessing these riches and enjoying these advantages the material prosperity of the colony is assured.

CAPE OF GOOD HOPE.

The following is a return of the revenue and expenditure of the Cape of Good Hope :—

Revenue and expenditure.

	£	£
1831	158,697	147,599
1846	201,624	189,494
1856	348,362	333,151
1863	734,975	649,879
1864	587,713*	663,236
1865	536,798	651,516†
1866	554,297	640,384†
1867	617,825	671,071†
1868	642,322‡	668,086
1869	580,025	648,732
1870	668,239	735,695
1871	744,788†	764,914
1872	1,047,748	922,567

Public debt.

Public debt, 1,160,007*l.*

No more prosperous year than 1872 is noted in the annals of the colony.

Prosperity of colony.

Farmers and others declare that during the last 22 years they have not had such splendid rains, nor such a fine season. The crops have been abundant and the prices of stock have much improved. Indeed the high prices realised for wool, feathers, and all farm produce, have tended to a much larger circulation of money throughout the colony than was ever before known. Trade rendered thus brisk, attained an extraordinary development through the operations necessary for the supply of the wants of a large population suddenly congregated on the diamond fields.

The effects of the prosperity created by these combined causes are clearly perceptible, although those causes had begun so far to operate in 1870, that the improvement is much more marked by comparison with the returns of previous years.

Population

The population, white and coloured, according to the last returns made in 1865, was as follows :—

European.	Hottentot.	Kafir.	Other.	Total.
181,582	81,598	100,536	132,655	496,381

* The actual revenue of 1864 is 19,000*l.* in excess of that of 1863. The apparent decrease is owing to the fact that in 1863, 266,000*l.* of the receipts were raised as a loan.

† These figures represent actual revenue and expenditure irrespective of loans.

‡ Including a temporary loan of 65,000*l.*

CAPE OF GOOD HOPE.

Cape trade.

VALUE OF IMPORTS AND EXPORTS.

	£	£
1856	1,588,393	1,327,175
1863	2,275,833	1,997,901
1864	2,471,339	2,594,594
1865	2,111,332	2,222,995
1866	1,940,281	2,590,348
1867	2,405,409	2,514,385
1868	1,956,154	2,215,885
1869	1,973,091	2,139,689
1870	2,352,043	2,569,499
1871	2,585,298	3,531,009
1872	4,388,728	4,666,071

These figures show the following extraordinary results, viz., that the revenue of the colony in 1872 has, as compared with 1871, increased by 302,000*l.*, whereas the expenditure has only increased by 157,000*l.*, and further, that the imports and exports have increased by 1,803,430*l.* and 1,257,436*l.* respectively. The principal item of increase in the exports is wool, the clip of which was most abundant, and the prices so high that the export of 1872 exceeded in value that of 1871 by upwards of one million sterling.

Value of diamonds, and further discoveries.

With regard to the value of diamonds exported in 1870, it is doubtful whether the amount was not over-valued at the Cape, though it is generally admitted, on the other hand, that many were carried away without any declaration at the Custom House. But as regards 1871 and 1872, there can be no question that far more than the four and three hundred thousand pounds worth of diamonds declared at the customs in those years respectively were shipped, for it was only by a few firms that that precaution was adopted, with a view to prevent any question with the underwriters, while large packets were transmitted every mail through the Post Office without any declaration whatever. The lowest estimate of the value of all the diamonds that left the colony during 1871 is placed at two millions sterling.

Sir H. Barkley, in his report on the Blue Book for 1871, states that the influx of specie, which amounted in 1871 to 522,540*l.*, and during the first month of 1872 to 475,270*l.*, was checked by the reported falling off in the number and value of diamonds recently found, and unless fresh fields are opened up, it is not improbable that re-exportation of part of this gold must be resorted to.

The question of fresh discoveries is a most important question for the commercial community, both in Europe and the colony, but it is of course almost impossible to arrive at

correct conclusions on a subject involving so many elements of uncertainty.

That the original diggings on both banks of the Vaal, which were during 1871 almost deserted for the "dry diggings," as they are called, are so far from exhausted that they will still, for many years to come, yield gems as splendid as any yet found in them, there can be little doubt. In all probability they will be extended both higher up and lower down the Vaal River, from Christiana to its confluence with the Orange River.

Diamonds too will doubtless, as hitherto, continue occasionally to be discovered throughout the immense area in which trap dykes have been formed through the elevated deposits known to geologists as the Dicynodon beds. Innumerable basins, resembling in all respects that which has attained such celebrity under the name of Du Toit's Pan, are to be found in Griqualand West, the Orange free state, and the Cape colony, any one of which may prove to be equally rich.

But to maintain the very large number of diggers of European origin now congregated at and around the dry diggings of Du Toit's Pan and De Beer's, far more brilliant discoveries than these are unquestionably required, and unless another "Colesberg Kopje," as the new rush on the latter farm is styled, be shortly found, the greater part of that population will be destitute of profitable occupation; and though the colonists may for the most part return to their farms and their stores, great distress must ensue among the emigrants from Europe, and others of that class.

In the London Colonial News of the 3rd September last, it was stated that a diamond weighing 147 carats had just been unearthed at Colesberg.

In the Blue Book Report for 1871 it is further said that "there are many kopjes or hillocks, and, reasoning *à priori*, "there seems no ground to suppose that the diggers should "at once have hit upon the only one of them in which such "marvellous treasures lay buried. It is true that in Aus- "tralia the richest gold fields were opened up within a few "years after the first nugget had been discovered; but there "alluvial deposits of nearly equal richness occurred at inter- "vals along a line of hundreds of miles, which is very "different from this profusion of diamonds being limited to "the dozen acres covered by Colesberg Kopje. *As no* "theory yet propounded explains the limitation of such "rich deposits to that particular spot, it may not unreason- "ably be hoped that they will yet be found to exist else- "where when the conditions are similar."

CAPE OF GOOD HOPE.

The time that will be taken to work out all existing claims at the kopje is variously estimated at from six months to two years, but the population is already rapidly dispersing. Fortunately the mineral resources of the interior of South Africa seem well nigh boundless. Several hundred diggers have already made their way to the newly discovered gold fields of Marabastad, in the South African republic, about 350 miles beyond Klipdrift, where the indications are said to be of a more promising character than at the remoter Tatin quartz reefs on the Limpopo River.

Gold.

"Within the colony gold has not yet been found in payable quantities, though the rocks extending over a large portion of its area are to all appearance so identical with those of Australia, that geologists from that continent are convinced of its existence.

"Mr. Dunn, formerly of the Victorian Geological Survey, who was engaged, with the concurrence of the Executive Council, to prospect, especially in Namaqualand, whence auriferous specimens had been forwarded, reports that, although unable to find sufficiently favourable indications of the precious metal, he considers that the deposits of copper in that part of the colony are only now beginning to be got at, and he is firmly persuaded that these will ultimately prove more valuable than the diamond fields."

Copper.

Similar deposits of copper are said to exist beyond the Orange River, in Griqua Land West, and recent reports from the district of Clanwilliam state that copper has been discovered both on a farm and on government ground there. Whether it can be obtained in paying quantities has to be proved. It is believed that parts of that extensive district possess great mineral wealth, and it is to be hoped that something will be done to open it up.

Exhibits at Vienna.

At the Vienna Exhibition a very worthy representation of the produce of the colony was secured, as will be seen from the catalogue of exhibits in the appendix, owing in a great measure to the energy of Mr. Julius Mosenthal, who was appointed commissioner. I shall now endeavour to give as much information as the limited space at my disposal will allow, respecting the commercial progress of the Cape, with especial reference to its principal exhibits.

WOOL.

Wool.

The first in importance is undoubtedly wool, the export of which within the last 50 years has so enormously increased that the Cape now exports nearly one fifth of the wool which comes into the English market.

	Quantity exported.	Value.
In 1820 -	46 bales -	£690
1830 -	111 „ -	1,665
1840 -	2,505 „ -	37,575
1850 -	19,879 „ -	298,183
1860 -	55,711 „ -	835,665
1871 -	146,082 „ -	2,191,233
1872 -	48,822,562 lbs. -	3,275,150

Sheep farming; improvement of stock and wool trade.

The Cape of Good Hope differs from Australia in that it has a native sheep, commonly called the fat-tail sheep, which is not a wool-bearing animal. The tail, however, is a useful article of domestic economy. It is used for frying and pastry, and as a substitute for butter. The tips of the tail when melted down give a pure and transparent oil. An attempt to introduce fine-woolled sheep into the Cape colony was commenced by the Dutch Government in 1724, but failed. In 1793 a few Merino rams were secured by the family of the Van Reenans. The conversion of the hairy breed of the colony into fine-wooled sheep was thus commenced; but it was not till the year 1812 that Mr. Reitz, who in 1817 was joined by Mr. Michael Breda, that any successful attempt was made in the direction of wool growing. It appears that these two gentlemen introduced a few Saxony rams and ewes, and commenced on a small scale that system of sheep farming which ever since has proved one of the chief sources of wealth to the colony. The progeny raised from this small flock was distributed amongst farmers in the western province. In that province there is abundance of water, and the result is that a well-washed combing fleece wool is produced, which is quite equal to that grown in New South Wales; but the farmers are small, and the western wool consequently forms a very small part of the great wool export from the Cape.

It was not till about 1827 that in the eastern province the value of this important branch of farming came to be thoroughly appreciated. In that division the lands are broader and better suited for sheep runs.

I find that in 1841 the value of the wool raised in the western province was 20,000*l.*, whereas in the eastern it was 28,000*l.*

Many persons who have farmed sheep in Australia have stated their conviction that the Cape possesses a superiority over that continent as a wool-growing country, as it enjoys a more equal climate, a superior description of pasturage, and greater cheapness of land. With regard to the breed of sheep in the colony, it is stated that in 1850 the late Mr.

CAPE OF GOOD HOPE.

Joseph Mosenthal discovered in Burgundy, now Côte d'Or, at a flockmaster's, a large and powerful Merino sheep of the Rambouillet breed, bearing a large fleece of wool, well packed and combining all the qualities for the rearing of wool, and of sufficient size to satisfy the butchers, who, caring for the meat and nothing for the wool, preferred the large African sheep to the smaller progeny of the Silesian and Saxony rams. 30 Burgundy rams were imported in 1850, and in 1851 150 rams, together with a few large thoroughbreds. The farmers were so pleased with these immense sheep, covered with wool to the feet, that rams at the public sales realized as much as 175*l.* each. The result of this importation was seen in the increase from 19,800 bales in 1850 to 55,700 bales in 1860, a rapid progress which has been maintained to the present time.

The Rambouillet breed has been found in every respect eminently fit for South African sheep farming, and nearly every mail steamer from Southampton takes out a few of these splendid animals. The Orange River free state and Trans Vaal Republic becoming stocked with these wool-bearing sheep, it is not surprising that the Cape of Good Hope has become one of the principal wool-exporting countries of the globe.

In mentioning the names of those who have contributed to the success of the Cape of Good Hope in this staple, it should be mentioned that for many years the breeds most esteemed were those of Lord Western, Mr. Dorien, Mr. Riley, and the South Australian Company. It is admitted on all hands that no one did more for the colony in this particular than Lord Western, who by supplying fine Merino sheep enabled the Cape farmers to improve the quality and quantity of this important article of export.

In consequence of the scarcity of water and the difficulty of procuring cheap labour, the greater portion of the sheep in the eastern province and the free state are shorn "in the grease" (unwashed), and unhappily many farmers shear every eight months, instead of waiting the 12 months' growth. Thus the eastern province wool, which is the chief part of the export, is so called "clothing" and not "combing" wool, being too short in the staple.

Near the port of Algoa Bay are large steam-washing manufactories, where the grease-wool is converted into "snow-white wool," artificially washed, and exported to Great Britain and the continent. 100 lbs of Cape grease-wool when thoroughly scoured does not yield more than about 33 lbs. of snow-white wool.

Reference has been made to the comparative value of the

exports of wool from Sydney and the Cape. New South Wales began its career in sheep breeding in 1795, and that colony took 35 years to produce 899,750 lbs. The Cape on the other hand produced in 28 years 911,118 lbs. CAPE OF GOOD HOPE.

It would appear that the annual exports from the two colonies in question are now very equal, it being remembered, however, that New South Wales has a start of some 30 years, for I find that in 1871, New South Wales exported 48,748,092 lbs. of wool, valued at 2,858,360*l.*, whereas the Cape in the same year exported 46,279,639 lbs., valued at 2,191,233*l.*

The Cape, however, has been far eclipsed by the colony of Victoria, which in 1871, in 37 years since her foundation as a separate settlement, exported 76,334,480 lbs. of wool, valued at 4,702,164*l.*

A comparative table of the exports of wool in 1871 from the principal wool-exporting colonies will not be uninteresting here. *Comparison of Cape wool trade with that of Australasian colonies.*

——	Approximate Date of first Export.	Population.	Quantity of Wool.	Value.
			lbs.	£
New South Wales -	1795	503,981	48,748,092	2,858,360
Tasmania - -	—	101,785	5,254,719	298,160
Victoria - -	1836	731,528	76,334,480	4,702,164
New Zealand - -	1839	256,393	37,793,734	1,606,144
Queensland - -	1859	125,146	22,339,348	1,158,833
South Australia -	1836	185,626	28,539,567	1,170,885
Natal - - -	—	192,859	5,763,999	172,806
Cape - - -	1820	480,995	46,279,639	2,191,233
Total -	- -	- -	271,053,578	14,158,585

In 1872, the Cape produced 48,822,561 lbs., valued at 3,275,150*l.*

The above table shows at a glance the magnitude and the value of the trade. At the close of the Peninsular war British colonial wool did not exist, and this country was the chief purchaser of French and German wools.

To-day, France, Belgium, and Germany are the largest purchasers of British colonial wool in London, and the importation of French and German Merino wool has nearly ceased.

It is calculated that 750,000 bales of British colonial wool are annually sold in London, which at 20*l.* per bale means roughly speaking an expenditure on that product alone of 15,000,000*l.* a year.

CAPE OF GOOD HOPE.

Census of stock.

At the last stock census in 1865 at the Cape, it was found that the total number of wool-bearing sheep was 8,370,179; of African, 1,465,806; of common goats, 2,316,020; and of Angora goats, 121,424. These figures bring me to the consideration of a comparatively new export, namely, that of Angora hair, which is destined to become most valuable, and of which many samples in rough, in yarns, and in stuffs were shown at the Vienna Exhibition.

ANGORA HAIR.

Angora hair, trade in and uses of.

The Angora goat is a native of Asia Minor; it has long white hair like white silk, and is shorn like a sheep.

It appears that the colony is indebted to the firm of Messrs. Mosenthal for the introduction of the Angora goat, and that Mr. Adolph Mosenthal proceeded in person to the East, secured some rams and ewes, and watched over them for months until he had successfully landed them in 1856 at their destination. 30 of these goats have been landed by that firm. In addition to the native sheep there is a native goat in Africa, and it is reasonably anticipated that the introduction of the Angora goat will transform the native goat into a fleece-bearing animal.

I have no means of ascertaining the increase in numbers from 121,424 in 1865 to the present time, but in the year ended the 31st December 1872, 876,861 lbs. of Angora wool were exported, of the value of 58,823*l.*

The spinning of the Angora hair into yarns is exclusively performed in Yorkshire.

The finer sorts of yarns are used in great quantities in Lyons in the manufacture of lace. A great quantity is also imported into Saxony, Austria, and Prussia, for dress goods and shawls.

By its softness and durability this staple compares favourably with silk.

The cross-breed goat wool from the Cape is sorted into four qualities, the two coarsest of which are manufactured into stuffs for ladies' cloaks in imitation of seal and other furs. These are made chiefly in the neighbourhood of Halifax, Yorkshire. The use of this wool in Great Britain is of comparatively recent date, and Sir Titus Salt, Bart., is one of the originators of the industry.

Attempts are being made to rear Angora goats in the River Plate states, and goats have been exported to that part of the world from the Cape. It is doubtful, however, whether they will thrive, as they are not accustomed to live on grassy and moist lands. The goats are used to drought

and poverty, and therefore thrive on farms in the Cape which are too barren and dry for sheep farming. In the district of Uitenhage, as well as in others, the Angora goat is successfully replacing the common goat, and flocks of superior breed are to be found in Somerset. CAPE OF GOOD HOPE.

The meat of the animal is delicious.

Owing to the crossing of the breeds the skin of the Angora has none of the qualities of the renowned Cape goatskin, which is unequalled for the manufacture of superior leathers. Between 300,000 and 400,000 of these skins are sold annually in the London market, where they realise 95*s.* the dozen. They are tanned in bark for the manufacture of black leather, and in shumac for that of coloured leather called "Morocco." Cape goat and goat-skins.

There is no reason why the Cape of Good Hope should not soon export as much Angora wool as is now exported from Asia Minor. For softness, durability, the brightness of its colour when dyed, and for its long staple, the Cape Angora wool is second to none.

OSTRICH FARMING.

Ostrich farming.

There is another branch of farming which is not only becoming very profitable in the Cape, but which is likely to be an important branch of industry, and that is ostrich farming. Everyone who visited the British colonial court at Vienna must have noticed the splendid samples of feathers exhibited on the Cape stall, and probably not a few were amused at the criticisms of those who so little appreciated their real value. In the year 1872, 26,695 pounds weight of feathers, valued at 158,024*l.*, were exported.

The prices per pound are, at the present date, December 1873:—* Price of feathers.

				£	*s.*	*d.*		£	*s.*	*d.*
White, bloods	-	-	per lb.	38	5	0	to	47	10	0
„ prime	-	-	„	30	0	0	„	36	10	0
„ firsts	-	-	„	24	15	0	„	28	0	0
„ seconds	-	-	„	18	0	0	„	22	10	0
„ tipped	-	-	„	15	0	0	„	20	0	0
„ thirds	-	-	„	6	0	0	„	12	0	0
Long coloured, light		-	„	12	10	0	„	19	0	0
„ „ fancy		-	„	13	15	0	„	20	0	0
„ „ dark		-	„	5	5	0	„	7	10	0
Tails, white	-	-	„	10	0	0	„	12	10	0
„ mixed	-	-	„	4	12	6	„	7	12	6
„ coloured	-	-	„	3	5	0	„	3	15	0

* London Colonial News.

			£	s.	d.		£	s.	d.
Cape of Good Hope.	Black, long -	per lb.	8	5	0	to	9	0	0
	„ short to mixed -	„	2	10	0	„	4	15	0
	Drab, long - -	„	3	5	0	„	3	15	0
	„ short - -	„	1	2	0	„	2	0	0
	„ dusters - -	„	1	9	0	„	2	18	0
	Young birds' - -	„	0	9	0	„	2	10	0

Incubation. Artificial incubation is now successfully resorted to.

The incubator is placed on a wooden floor which is covered with a blanket; the room in which it is placed is kept at a temperature of about 55° to 60°. The cistern of the incubator holds 16½ gallons of water, which is kept at a temperature of 104°–105° during the first 23 days, and then lowered to 102°.

The eggs are placed in a drawer under the cistern; the incubation takes from 45 to 50 days.

Soon after a bird is hatched it will readily sell for 10*l.*, and in Riversdale last year a pair of young birds a year old realised 120*l.*

A good many of the most enterprising farmers are now turning their attention to this branch of farming, which is more remunerative than any hitherto tried in the colony; and when it becomes more generally known how well it pays, doubtless many persons who are now engaged in other pursuits will devote their energies to it.

Only those who have suitable farms and can afford to enclose large tracts of country, thus giving the birds a wide range, can, however, hope to be successful. The ferocity of the domesticated male bird will not admit of its being at large, and enclosures are consequently necessary.

In the district of Prince Albert there are 600 domesticated birds, in George there are 1,500, and much country that was formerly overgrown with bramble and weeds is now enclosed and used as a camp for the ostriches.

In Colesberg, Riversdale, Bredasdorp, and Mossel Bay, ostrich farming is also successfully and rapidly increasing.

Wine.

Wine. The only other produce of the Cape to which I shall refer in detail is wine.

The wine growers are of a superior class, and many of them are of French descent.

Wine is produced principally in the districts of the Cape, Stellenbosch, Worcester, Swellendam, and George.

Quantity. In former years the amount of wine made in and exported from the Cape was very large; thus in 1859 the exports amounted to 999,575 gallons.

In 1865 it amounted to only 192,869 gallons, and in 1872 to 77,999, exclusive of 371 gallons of Constantia. CAPE OF GOOD HOPE.

This serious falling off in the wine trade has been owing, no doubt, partly to the heavy duties imposed on Cape wines under the provisions of the treaty with France of January 1860, which established the alcoholic scale which is still maintained. Wine trade, falling off in.

In consequence of the distance from England, and the tropical latitudes which have to be passed through on their way to the mother country, it is necessary to fortify the wines considerably with a view of preventing deterioration and fermentation.

The bulk of the wines produced at the Cape require a greater alcoholic strength than 26 per cent., which is the limit of the 1*s.* per gallon duty, and therefore are subject to a duty of 2*s.* 6*d.* per gallon, which probably acts in a prohibitory manner.

The wine growers of the Cape are in these circumstances naturally anxious that an uniform rate of duty amounting to (say) 1*s.* 6*d.* per gallon should be imposed on all Cape wines admitted into the United Kingdom, and that South African wines should not have a higher rate of duty imposed unless they contain more than 38 degrees of proof spirit.

As compared with the wine growers on the continent of Europe, those of both the Cape and Australia are at present, therefore, apparently at a disadvantage.

The samples of Cape wine sent to Vienna, and especially the Constantia, were very good. For sherry and Constantia Messrs. Collison received the medal for progress. For wines and other produce Messrs. Russell received the medal for merit.

Eleven medals were awarded to exhibitors from the Cape of Good Hope, and nine received honourable mention.

In addition to the produce to which I have referred in detail, models of the largest Cape diamonds, and also specimens of gold ore, copper ore, Natal coal and cotton, hides, rhinoceros horns, ivory, guano wheat, flour, cigars, snuffs, dried and preserved fruits, sugar, arrowroot, &c. were exhibited.

There were, by the way, specimens of silk, with reference to which I may observe that amongst the experiments the colonists are making is the introduction of the silkworm, which is being attended with success. The mulberry tree grows spontaneously in the colony, especially on the S.E. coast. Silk.

I annex a table showing the progress of the colony from a commercial point of view since 1864:— Progress of colony.

Imports.

Principal Articles.		1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.
Apparel and Slops	£	159,496	152,274	105,228	161,260	113,583	115,838	122,508	162,695	322,616
Beer and Ale, Bottled	Gallons	179,255	155,185	95,970	}					
	£	31,744	27,517	16,459	366,596	458,498	380,867	340,492	438,761	—
" " In Wood	Gallons	249,566	324,371	284,116	48,246	54,017	44,588	42,046	59,559	—
	£	21,744	27,735	22,608	}					
Cabinet and Upholstery Wares	£	27,086	27,809	15,398	14,976	17,119	14,814	18,371	23,118	—
Coals	Tons.	38,248	30,811	23,289	35,979	46,024	32,554	17,388	16,105	—
	£	39,097	30,729	21,344	36,034	52,621	28,837	16,494	14,481	—
Coffee	Cwts.	53,236	27,101	82,398	50,662	52,995	56,784	64,099	49,704	—
	£	155,636	76,057	214,053	111,998	107,114	110,339	141,241	117,254	—
Cotton Manufactures	£	337,054	332,768	325,551	489,874	305,178	320,736	439,086	448,758	666,599
Haberdashery and Millinery	£	270,533	264,257	207,200	252,849	237,363	237,120	249,084	284,686	474,325
Hardware, Cutlery, and Ironmongery.	£	113,543	107,634	65,773	86,307	99,941	96,933	120,308	174,960	306,475
Iron: Bar, Bolt, and Rod	Cwts.	21,880	21,060	28,940	17,805	24,957	22,179	28,182	31,803	—
	£	11,605	11,352	6,804	8,796	11,536	10,033	12,733	15,795	21,275
Leather, Manufactured	£	73,307	81,258	47,092	73,850	71,926	73,244	96,433	102,415	306,290
Linen Manufactures	£	14,682	22,482	21,854	36,009	23,541	19,202	23,251	38,217	79,270
Oilmen's waste	£	61,444	37,249	29,703	44,612	35,080	34,340	46,644	55,237	—
Rice	Cwts.	85,735	42,655	100,402	130,841	67,752	56,774	101,340	61,656	—
	£	40,490	23,122	50,224	72,857	29,450	24,810	44,463	29,558	—
Saddlery and Harness	£	16,244	19,944	9,190	10,837	12,409	15,363	19,829	24,132	52,030
Sugar, Raw	Cwts.	116,432	97,683	101,841	127,358	100,483	107,980	138,436	125,502	—
	£	135,025	104,389	109,213	132,594	101,249	116,591	155,595	144,096	—
Tea	lbs.	137,540	388,459	144,229	437,478	158,098	547,947	869,186	396,147	—
	£	9,923	23,699	9,041	23,588	10,806	29,265	39,663	18,068	—
Tobacco, Manufactured	Cwts.	4,112	215	627	2,041	1,187	1,097	1,393	1,969	—
	£	33,894	2,358	5,216	11,444	5,600	5,169	6,599	9,569	—
Wood, Deals	Cubic ft.	482,635	224,269	32,825	251,697	338,900	152,506	313,738	372,288	—
	£	32,523	14,185	1,522	10,379	15,563	9,189	17,579	21,857	—
Woollen Manufactures		82,275	99,424	64,729	115,570	106,674	112,361	126,415	162,284	204,860
Total Value of principal and *other Articles*	£	2,493,389	2,125,332	1,942,281	2,415,409	1,996,606	1,968,191	2,502,043	3,107,838	4,388,728*

* Full information as to the separate items for 1872 not accessible, although the total value is known to be correct.

EXPORTS.

Principal Articles.		1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.
Copper Ore	Tons	4,327	4,500	4,284	5,625	2,926	5,590	7,300	7,351	13,240
	£	122,722	118,297	90,389	120,971	61,543	114,201	146,368	160,956	328,458
Feathers, Ostrich	lbs.	17,873	17,811	15,144	18,921	16,163	18,920	29,805	25,508	26,695
	£	81,755	66,426	75,661	75,221	63,193	70,750	91,229	150,769	158,024
Fish, Cured	lbs.	4,126,094	3,056,109	4,266,502	3,323,967	4,565,472	3,949,634	5,568,389	5,293,563	3,248,241
	£	21,748	13,537	22,097	16,176	21,611	22,262	26,599	25,536	17,408
Hides, Ox and Cow	No.	34,289	14,536	21,220	21,743	24,984	29,302	34,788	46,431	72,937
	£	16,048	9,824	12,953	14,022	11,251	17,304	21,805	30,025	45,771
Ivory	lbs.	26,013	30,241	40,969	61,514	36,669	55,155	60,419	46,382	87,389
	£	4,488	10,486	10,114	11,018	8,772	13,482	14,546	11,566	23,976
Precious Stones, Diamonds	No.	—	—	—	—	1	147	5,864	35,169	45,830
	£	—	—	—	—	150	24,813	153,460	30,349	306,041
Skins, Goat	No.	450,247	549,057	678,364	639,194	681,259	874,812	893,310	1,233,976	351,918
	£	55,716	60,621	79,754	65,449	66,762	103,838	126,112	172,055	192,503
„ Sheep	No.	891,360	970,129	1,018,298	1,232,210	1,239,383	1,237,152	1,484,076	1,448,245	1,436,857
	£	76,453	79,160	87,005	93,746	79,320	77,964	87,240	97,165	140,011
Wine, Ordinary	Gallons	175,601	192,869	93,164	71,263	84,565	130,966	88,533	61,689	77,999
	£	24,986	24,499	13,628	10,646	13,139	17,370	13,887	10,742	14,861
Wool, Sheep's	lbs.	36,413,689	32,806,246	35,231,607	36,026,614	36,489,760	37,224,263	37,283,291	46,609,653	48,822,562
	£	1,871,068	1,681,665	1,994,204	1,927,628	1,806,995	1,602,597	1,669,518	2,210,748	3,275,150
Total Value of principal and *other Articles*	£	2,613,709	2,297,173	2,599,169	2,530,600	2,320,326	2,267,255	2,603,211	3,585,996	4,666,011

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CAPE OF GOOD HOPE.

CONCLUSION.

In conclusion it is not necessary for me to do more than to quote the following extract which appears in a despatch dated the 26th July 1873, from the governor of the Cape of Good Hope, in which, when commenting on the prosperity of the colony, he observes, "It would scarcely be much "exaggeration to say that the rapidity of the progress of "South Africa during the last three or four years is "paralleled only by that of the Australian colonies after "the discovery of gold."

CEYLON.

CEYLON.

Ceylon is situated in the Indian Ocean off the southern extremity of Hindostan; it is between 5° 55′ and 9° 51′ N. lat., and 79° 41′ and 81° 54′ E. long.; its extreme length from north to south is 266 miles; its greatest width 140½ miles; its area 24,700 miles, or about 15,808,000 acres.

Ceylon is the wealthiest and the most populous of the Crown colonies of Great Britain.

History of.

It would be quite impossible within the limits of space assigned to me to give anything like an adequate description of the history of this colony, or to trace in detail the extraordinary financial and commercial progress it has recently made. For the purpose of this report it will be quite sufficient, so far as the history of Ceylon is concerned, to state that on the 16th February 1796, the Dutch Government surrendered all authority over the maritime provinces to the British forces, and that, with the exception of the mountain zone ruled over by the king of Kandy, the island became subject to India.

In 1818, after the defeat and imprisonment of the king, and the suppression of the Kandian rebellion, the whole island came under the rule of the Government of this country.

Physical features.

By enthusiastic writers Ceylon has been described as an island whose "surrounding seas are sown with pearls, whose "woods are cinnamon, its mountains covered with rubies, "its caverns full of crystal—in a word, the place which "God chose for the terrestrial paradise." The Singalese fully believe the latter assertion, and have called one of the highest spots in the island, 7,380 feet, Adams-Peak, the

place from which Adam took his last view of Paradise before he was expelled from the garden.

Physical features.

The central province is mountainous, and its general elevation about 2,000 feet above the sea.

The west and south coasts are low and fringed with cocoa-nut trees, which grow in great luxuriance to the water's edge. On the north the whole breadth of the island is one vast sandy plain teeming with jungle and swamp. In many parts the coasts are indented by the sea, and present several large and many small harbours. Trincomalee on the north-east coast is one of the finest in the world. Point de Galle on the south is at present the port for mail steamers.

As a rule the face of the country presents every variety of beautiful and grand landscape. Approaching the island from the east the land rises gradually, clothed with verdure, and interspersed with villages and fine trees.

Further back are ranged plantations of coffee and cinnamon, overtopped by a mountainous range, whose heights are covered with magnificent timber. In the interior the country is like a most luxuriant garden. Every variety of flowering shrub flourishes, and the forests are singularly attractive from the varied contrast afforded by the different hues of the foliage.

For a tropical colony Ceylon has a comparatively healthy climate, but some of the less inhabited parts, and the low wooded country between the mountains and the sea, are very unhealthy. The quantity of rain which falls during the year is about three times as great as in England. The seasons depend very much on the monsoons: the coolest season is during a period of the summer when the south-west monsoon prevails. The heat is nearly the same throughout the year, but much less oppressive than in Hindostan. Along the coast the annual mean temperature is about 80° Fahr.; at Kandy, 1,465 feet above sea level, it is 76° (average of ten years); at Colombo, the capital of the island, the annual variation is from 76° to 86°; at Galle 70° to 90°; and at Trincomalee 74° to 91°.

The rapid extension of coffee planting has led to an entire opening up of the country by roads and railways.

Population. Revenue and trade.

The population amounts to 2,405,287. The revenue and expenditure for 1872 were, respectively, 1,174,698*l.* and 1,062,994*l.*

The imports and exports in 1872 were 5,169,524*l.* and 3,139,060*l.*

Fuller progressive statistics will be given later on.

CEYLON.

Of the 12,075,335 acres of land in the colony only 1,580,000 are under cultivation.

Ancient tanks.

The ruins of vast tanks in the interior, the remains of deserted villages and other remnants of antiquity, of which exquisite photographs have recently been taken, which unfortunately were not sent to Vienna, prove that much land which is now a wilderness was once inhabited by a large population, by whose labours an immense amount of land yielding rice and cotton was cultivated. Large quantities of rice are now annually imported, but great impetus has during the last few years been given by the Government to works of irrigation. The present governor, the Right Hon. W. H. Gregory, in writing of Nuwarakalawiya last year said, "This magnificent district has the strongest "claims upon us. It was once the granary of the island; "it is now utterly neglected. It has a population of "60,000 persons and over 1,600 villages, which have each "of them their tank. There are at least 1,700 tanks, and "I am credibly informed not one of them has its sluice in "order.

Irrigation.

"I have ordered a careful preliminary survey to be made "for irrigation purposes, and I trust that in a few years "hence the population may present the same vigorous ap- "pearance as the population of the eastern province, and "from the same cause, namely, good and plentiful food."

The extension of irrigation works and the repairs of some of the ancient tanks will doubtless have the effect of extending the cultivation of rice, which is a most necessary article of consumption, and which, as I before observed, is in the absence of a sufficient supply for home wants imported in large quantities from the neighbouring continent. The great scarcity now prevailing in Bengal is a proof of the absolute necessity of an increased production of rice in Ceylon.

Exhibits at Vienna.

I propose now to refer in detail to the principal articles of produce sent by the Ceylon Commisioners to the Vienna Exhibition; but before doing so I must observe that, in reply to the Secretary of State's circular, the Government of the colony declined at first to be represented, and that therefore no space was reserved for its exhibits. It was not until the middle of April that I received a catalogue of goods which had been forwarded to Vienna from Ceylon, and it was impossible for me to allot to them so good a position as I could have done if an application for space had been put in at the proper time.

The catalogue of products forwarded by the Commis-

sioners, which I shall now proceed to review, will be found in the Appendix. CEYLON.

PLUMBAGO. Plumbago.

The exportation of plumbago, which is the only discovered mineral of importance in Ceylon, has considerably increased during the last few years, owing to the extensive European demand for crucibles. Crucibles made of plumbago have a much greater power of resisting the high temperature employed in smelting than any others yet constructed.

The raw material is found principally in veins underlying quartz in the south and south-west of Ceylon, and is worked by the natives under licenses from Government.

It is difficult to obtain it in lumps of large size, such as the magnificent specimen sent by Messrs. Volkart, Bros., (now in the Hofcabinet in Vienna) or the "sculptured elephant," sent by M. Fernando. It is chiefly exported in small nodules, packed carefully in barrels to protect it from damp.

It is also largely used in the preparation of what is called "black lead" for polishing purposes, and is besides extensively mixed with pure Cumberland lead for the production of inferior drawing pencils.

A more recent application of it, and probably the most useful, is as a lubricant. Owing to its close molecular structure it possesses many of the properties of grease, and has one advantage over it, viz., that it does not become foul or hard, and is therefore less likely to clog.

As an anti-frictional for the journals and bearings of machinery, especially when of great size and consequent weight, it is likely to supersede in a great measure other materials now used.

The figures demonstrating its increased export are as under:—

1861 - - - - -	83,605 cwt.
Year ending 30 Sept. 1873 -	168,267 cwt.

There are at present 137 plumbago mines in operation.

IRON. Iron.

There are many indications in the colony of past working in this material, but it has been from surface collection of the raw material. The Singalese from early times are said to have worked the ore into tools and implements, and although their construction is rude they prefer them to those imported from England.

CEYLON.

Iron exists in almost inexhaustible quantities upon the surface in several districts in the island, both in the form of pyrites and in fused mixtures indicating volcanic action at some past period.

That it exists largely in subterranean masses which would repay mining, is said to be evident from the extensive formations of clay indurated by the material which form a considerable portion of the immediate substratum of the soil all over the southern and south-western portions of the colony. Thus indurated, this clay, when cut out in blocks, hardens rapidly by the action of the sun, and is easily converted into an useful building material for structures of low elevation, where there is not great pressure upon it.

Owing to the large and comparatively cheap introduction of English iron, its preparation by the natives is very limited, and as the existence of coal in the colony is as yet undiscovered, it is not likely to extend.

Although discoveries have recently been made on the continent of India of forgings in iron of a forgotten period, far exceeding in weight and finish anything attempted in Europe before the introduction of steam power, the secret appears to have been entirely lost, and is not known to have even extended to Ceylon.

The preparation of iron and steel is therefore at present confined mainly to small bars or implements for ordinary agriculture, such as rough knives and the like, which can be purchased in the native bazaars.

It possesses, however, according to Sir Emerson Tennent's account, many of the advantages of Swedish iron. This is perhaps partly owing to its being smelted with charcoal made from the ranawara, a specimen of which was forwarded to the exhibition, and which possesses considerable carbonizing properties.

Great labour is expended by the natives upon their preparation of the steel, which in process of manufacture becomes unusually hard and close in texture, and is stated to possess many of those properties which admitted of the exquisite tempering given to sword blades of eastern production in mediæval times.

Unless coal can be found in Ceylon, and the geological formations in several parts of the island would seem to admit of reasonable hope that it may ultimately be discovered, no extension of iron manufacture is likely to take place. At present it is so small as hardly to be classed as an industrial production.

There were 14 iron mines, however, in existence in 1871.

Ironstone gravel is found in considerable quantities in various districts, and is used freely and with the best effect in road making.

CINNAMON.

Cinnamon. Growth and treatment of.

This spice, which formed the staple article of export from the colony under the Dutch rule, is now exclusively and profitably grown mainly in the neighbourhood of Colombo, and has somewhat the appearance and is about the size of the European laurel. Owing to the large production of the Dutch colonies in Java and Sumatra, under the compulsory labour system, Ceylon for some time failed to compete successfully, and the cultivation and curing of the spice became to a certain extent abandoned as unprofitable. But of late years, owing to the immense improvement in the preparation and cultivation of the spice, and to a largely increased demand at remunerative rates, there has been an increased export, as evidenced by the figures quoted below, and the cultivation is still extending.

The plant is grown principally in the neighbourhood of Colombo, the sandy soil surrounding that city being especially favourable to its growth. It exhales no perfume, but the bruised leaf or bark has a powerful odour of the spice. By careful pruning the plant can be made to grow the twigs or their branches free from knots, which yield what is called the pipe cinnamon, possessing a higher marketable value than sheet bark, which is peeled from the stem. The twigs are cut at stated times, a cut being made, if necessary, down one side. They are then dried in the sun, and the bark becoming by the heat detached from the twig requires but slight manipulation to remove it.

The finer and younger the twig the more delicate and valuable is the bark.

It is then carefully sorted into different qualities and sizes, and packed in bales for export.

Exports of cinnamon:—

	Quantity.	Value.
1861 -	- 845,218 -	- £42,261
1871 -	- 1,359,327 -	- 67,966

The cinnamon sent to Vienna was magnificent.

COFFEE.

Coffee. Growth and treatment of.

The soil is peculiarly suited to the growth of coffee, and it now forms the chief article of export. The plant is of the laurel tribe, and was first grown by the British in Ceylon about 1825. The cultivation rapidly extended, and was at

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the outset so successful that a perfect mania set in for speculation in estates, which reached its climax in 1845. A crisis in money matters in England, and the withdrawal of the distinctive duty which had so long screened British plantations from competition with the coffee of Java and Brazil, brought almost total ruin on the planters, resulting in the abandonment of many estates and the sale of others for nominal sums.

The crisis, if it had not been precipitated in 1845, would have ensued from the want of experience and indiscretions of the previous period. Estates were opened at too low an elevation, and manuring was almost entirely neglected, whilst the accidental introduction of the "lantana" or "goat weed," which rapidly overran the estates, rendered their proper weeding (a most important operation) very expensive and difficult.

It was not long, however, before the great demand for the berry in Europe stimulated its production, and wiser measures, the result of past experience, were adopted. The increased profits and consequent rapid extension have led to the opening of new plantations, until most of the hills in the central and portions of the southern and south-western provinces have been denuded of their original forest in order to give way to coffee planting. As means of communication and railway transport extend, it is quite possible, and indeed probable, that there will be no available ground undevoted to this purpose.

The amount of available land is, however, circumscribed, owing to the fact that coffee will only grow without irrigation at elevations ranging from about 1,200 to 5,000 feet above the sea, and these may be considered the limits of profitable cultivation. Situations on spurs of hills exposed to severe winds are wholly unsuitable.

Where either the soil or the situation has produced the growth of primæval forest, there coffee will not flourish; but it is as yet undecided whether the liberal application of manure to the poor soil of these so-called "patenâ" lands may not ultimately enable them to produce the plant. If the present high price of coffee is maintained, and the extension of railways enables foreign manure to be extensively used, even these lands may be brought into remunerative cultivation.

On the purchase of forest land from Government at prices ranging from 3*l.* to 10*l.* even per acre, the first step is to fell and burn the timber. Nurseries of young plants are then grown, and they are planted out, when a few inches high, at distances from each other of six to eight feet.

The plant commences bearing in its second year, and a good estate should be fairly remunerative in its third year. Coffee has, however, many enemies to contend against, such as bug and rats, and instances are common of flourishing estates being wholly destroyed by them. Excessive drought or excessive moisture are equally fatal.

Pruning is extensively practised on all estates, and naturally results in the formation of healthy wood and heavy bearing of berry. In native gardens the tree is left to its natural luxuriance of growth, when it attains a height of 12 to 14 feet. On estates it rarely is allowed to exceed four feet in height.

The operation of *picking* is performed by gangs of men, women, and boys, who are employed by the day or paid according to results.

On hilly estates having a good supply of water, galvanized pipes lead from convenient spots to the storehouses, and through these pipes a rush of water is allowed to flow.

Instead, therefore, of carrying the gathered berries to the store, it is only necessary to empty them into the pipe, and the flow of water carries them to the store for distances of nearly a mile. On reaching the store the berries are placed in a machine termed a pulper, which has two cylinders of zinc roughened on the surface revolving in reverse directions.

Between these the berries are carried with a flow of water, and the outside pulp, which is termed the cherry, is then removed, it being afterwards used for manure.

The bean is left with a thin skin or husk over it, and in this condition it is termed parchment coffee.

When dried on asphalte floors it is packed for transport in bags, and is sent to Colombo for curing.

The cost of this transport is one of the most serious items the planter has to contend with, and not unfrequently there is an almost total absence of means of transport.

If kept long in store in parchment, the coffee heats and quickly deteriorates.

Its rapid despatch to the curing houses is therefore of importance, and this result is daily being more fully secured by railway extension and the construction of good cart roads.

On arrival at Colombo the parchment or husk above referred to is removed by machinery, the process being a species of winnowing. The peeled coffee is then passed down a tube of zinc perforated throughout its length by holes of regularly increasing diameter, thus being sorted into sizes. The last operation is removing by hand all diseased or

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malformed beans. The latter are sold at a cheap rate, though there is no difference save in appearance.

If the bean has an oval shape it is termed peaberry, and fetches the highest price, whilst below that description the value of the sorts increases with their size.

The sorting being complete, the coffee is packed either in casks or bags, the finer sort always in the former, and it is then shipped for Europe.

The blossom of the coffee is similar both in appearance and smell to that of the jasmine, and is deliciously fragrant, but becomes overpoweringly so to residents on the estate, and is supposed to produce fever.

As a speculation coffee is only as a rule remunerative to those investors who are on the spot to look after their own interests, in consequence of the high charges advanced by local agents, and the difficulty of ensuring honest and energetic supervision in dealing with the native labourers.

The success of further cultivation greatly depends on the development of the labour market by Coolie immigration from the coast of India, or by opening up other sources of supply as yet untried. The local Government has done much to ensure rapid and safe means of transit in the former instance.

The planters lose largely with their advances to "kanganies" or "gangers," who go to the coast to fetch men. It is therefore probable that an organised Government system of free passages by steamers, to be paid for by the planters themselves, and not out of general revenue, would be the most profitable method of inducing still further immigration from India.

If that source were exhausted, China might prove an available one.

The magnificent samples of coffee at Vienna attracted great attention, and I was frequently asked for a few berries.

Small samples were given to the Ministry of Agriculture, as well as to numerous merchants.

	Native.			Plantation.		
	Date.	Quantity.	Value.	Date.	Quantity.	Value.
		cwts.	£		cwts.	£
Exports of coffee -	1861	132,818	265,266	1861	517,499	1,397,248
Native and Plantation	1871	170,396	338,760	1871	775,452	2,093,667

VANILLA

Vanilla.

Is a species of creeper which grows to a height of about 18 feet. When properly prepared it has a peculiar and delicious odour. It is principally used for mixing with and perfuming chocolate and confectionary.

It is not, however, much known in this country, and I can find no record of the amount grown in or exported from Ceylon.

A very excellent sample was sent to Vienna.

CINCHONA.

Cinchona.

The cultivation of this was commenced rather more than 10 years ago; a number of young plants, carefully selected, were imported and set in the botanical gardens at Hakgala, at an elevation of about 6,000 feet. The results as an experiment have been most satisfactory. The trees have already yielded a small supply of bark, which has been valued in England at an exceedingly high rate.

A large number of crossed species have been spontaneously developed, which it is believed will produce exceptionally fine bark.

The coffee planters have largely availed themselves of the gratuitous issue of young plants from the Government plantation, and have placed them in those positions on their estates which are unsuited for coffee.

Sufficient success has been attained to justify sanguine hopes that an extended cultivation will be profitable. Upwards of 694 packages, valued at 6,410*l.*, were exported in 1872, against 80 packages, valued at 31*l.*, in 1871.

TEA.

Tea.

The experimental introduction of this is quite in its infancy. It is nearly certain, however, that its growth may be profitable in localities unsuited to coffee, and that a fine quality can be produced. Reports from experts in Europe speak favourably of the quality of the leaf itself, but complain of the curing. This appears to require special training, and until men possessing that qualification can be introduced, success will probably not be so remunerative as to induce its extended cultivation.

The soil and climate are favourable to its growth.

I have not information as to what sorts have been produced or whether the seasons for picking the varied descriptions

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have been as yet satisfactorily determined; they must differ very materially from those suitable to the low and moist lands and climate of China. The sample sent to Vienna had a good "bouquet," and the leaf appeared very regular, but compared with Chinese teas it looked twisted and parched.

The Government is encouraging the extension of the cultivation of tea, and is ready to introduce from India experts in the manipulation of the leaf, if the planters should desire such assistance.

Cocoa-nut tree fibres and cordage and cocoa-nut oil.

COCOA-NUT FIBRES AND CORDAGES.

Coir is the fibre of the outer covering or husk of the cocoa-nut. It somewhat resembles cork with fibre closely embedded. The cocoa-nut palm is grown on low sandy soils from which it can readily absorb any moisture, but demands extensive manuring. The natives have a proverb that the cocoa-nut palm will not grow out of the reach of the sound of the human voice, and it is a fact that the finest trees grow in compounds or gardens that are thickly peopled. This is fully accounted for by the habit of the natives, who dig holes under the trees for the deposit of human excreta, covering them up after each use; the trees thus become highly manured.

The opening of a cocoa-nut estate is a tedious and costly operation, and one that rarely repays the original outlay.

The tree does not come into bearing until it reaches the age of seven years, and is not in its prime till 20 years old. Like all palms it requires care in the mixture of the sexes, or the trees are unfruitful.

It has many enemies, mainly the beetle, which is a borer and deposits its larvæ in holes drilled almost into the centre of the tree, which then sickens and dies. Drought affects its growth and development and it is said to be possible to determine dry and wet seasons in past years by noting the various contractions and enlargements of the stem in its growth.

Parasitical plants too embrace the trees, and when fully grown contract upon the stem so as to hinder the free passage of the sap, and the tree is thereby strangled and killed. The principal plantations are in the Jaffna Peninsula and at Negombo and Batticaloa, and pay the present proprietors remuneratively, but there is scarcely an estate in the hands of the original planter.

Picking goes on all the year, but is mainly confined to two crops after the monsoon rains have developed the fruit. The nuts are husked upon steel-pointed stakes, by which the outer covering is split and wrenched off. This husk is then buried in pits dug in the sandy shores of the salt-water

lagoons at low tide, and left thus for six or seven weeks. The decomposition of the corky matter surrounding the fibre results from the action of the salt.

The husks are then beaten with a mallet upon a stone, principally by women, and the fibre is detached clean and white. It is left to bleach for a short time in the sun and is then packed in bales by a screw press and forwarded to the Colombo Mills, where the various processes of its manufacture into ropes and matting are conducted.

There is scarcely an article of human use which native ingenuity does not adapt from the cocoa-nut tree. With its wood, which is useless for other purposes, rude bridges are built. With its leaves plaited together, and termed "cadjans," roofs and walls of houses are thatched. Its sap produces the spirituous liquor called "toddy," arrack is distilled from its blossoms, and the kernel of the nut is sometimes eaten, both fresh and dry, though it is mainly crushed to obtain cocoa-nut oil, the residue being converted into a valuable oil cake termed "poonac," and used universally for cattle food.

The exports of coir and cordage have much increased, but the rudeness of the process of preparation and want of proper machinery have hitherto been a check upon its improvement and extension.

Large establishments for crushing the nut by steam have been opened at Colombo, from whence it is exported to England for the manufacture of candles.

For the production of cocoa-nut oil there are 2,051 mills in the southern province.

There are also 801 bullock mills in the western province in which oils are expressed. The total number of mills in the colony is 3,043.

Exports fibre, &c.

The following were the exports of coir fibre, rope, and yarn, in 1871 :—

	Quantity.	Value.
Coir fibre -	- 7,528 cwt. -	- £4,449
Rope - -	- 10,998 -	- 12,919
Yarn - -	- 46,898 cwt. -	- 28,078

There were also 561 cwt. of Kitool fibre exported, at a value of 1,380*l.*, and 14,976 gallons of arrack, valued at 1,385*l.*

A decennial return to 1871 of the exports of coffee, cinnamon, cocoa-nut oil, and coir, is annexed, and it proves enormous progress in each of those industries.

The principal fibres sent to Vienna are now in the custody of Dr. Hooker at Kew.

DECENNIAL RETURN of EXPORTS of COFFEE, CINNAMON, COCOA-NUT OIL, and COIR, the PRODUCE of the COLONY.

Years.	Coffee.			Cinnamon.			Cocoa-nut Oil.			Coir.			Total Amount of Customs Revenue from the foregoing Exports.
	Quantity.	Value.	Duty.	Quantity.	Value.	Duty.	Quantity.	Value.	Duty.	Quantity.	Value.	Duty.	
	cwt.	£	£	lbs.	£	£	gals.	£	£	cwt.	£	£	£
1862	605,178	1,445,284	30,259	875,475	43,774	876	1,429,531	142,953	3,591	46,595	37,648	583	35,309
1863	828,587	2,126,222	41,429	734,038	36,702	734	1,878,585	187,858	4,718	51,785	39,103	647	47,528
1864	671,164	1,744,793	33,559	776,675	38,833	775	2,249,402	224,948	5,649	36,313	27,386	454	40,427
1865	927,440	2,343,532	46,373	850,973	42,549	852	1,176,784	120,678	2,955	41,378	31,637	516	50,696
1866	897,624	2,286,880	44,882	890,484	44,524	890	1,042,853	104,400	2,619	46,687	33,035	594	48,985
1867	943,592	2,430,536	47,180	1,017,750	50,887	1,018	1,345,485	134,548	3,379	49,675	34,446	621	52,198
1868	1,007,338	2,563,999	50,367	2,056,509	102,825	2,057	1,423,853	142,385	3,576	68,804	46,607	861	56,861
1869	919,065	2,391,980	45,954	2,684,367	134,269	2,685	1,292,065	129,206	3,244	64,998	43,013	812	52,695
1870	1,054,029	2,753,004	Free	2,191,274	109,558	Free	1,688,199	168,819	Free	61,666	43,430	Free	Free.
1871	945,851	2,432,427	Free	1,368,174	68,410	Free	2,577,700	257,770	Free	65,424	45,448	Free	Free.
Total	8,799,868	22,518,657	340,003	13,445,719	672,331	9,887	16,104,457	1,613,565	29,731	533,325	381,753	5,088	384,709

WOODS.

The principal woods exhibited at Vienna were as follows:—

Nedun.—Used for ornamental purposes only; colour, reddish brown; becoming rare.

Sapan.—A red dyewood.

Milila.—A durable wood, light yellow and free from knots. Used in bridge building and for beams generally.

Halmilla.—Light reddish brown; a most valuable wood, not sufficiently known out of the colony. It is nearly as light and elastic as lancewood, and is used for many purposes to which the latter is generally put. The demand for it for making casks has caused a scarcity, and the felling is temporarily prohibited in some districts.

Cocoa-nut.—The outer rind of the tree admits of being worked up in small scantlings for furniture, and has a speckled reddish brown fibre running through it. As a timber it is useless, except as piling for very temporary structures.

Areca-nut.—Very useful for long flexible spars for temporary purposes. It splits freely into laths, but is not durable. The tree is, without exception, the most graceful of the palm tribe, and bears the small nut which is chewed by the natives with their betel leaf. It is therefore largely cultivated, and forms most picturesque groves round every village well.

Satin.—A fine hard wood of great strength and durability, and grows of great size. In density it is nearly equal to ebony. The tree is liable to some disease which intermittently checks the flow of the sap, and appears thus to cause those beautiful veinings which give the name to the "flowered satinwood." There is no outward indication of this, it is only ascertained after the tree is felled whether it will yield this last much-prized wood, which makes perhaps the most beautiful furniture known. The ordinary kind is used for all descriptions of work, from the heaviest to the lightest. It makes the most durable planking for bridges known.

Ebony.—This is too well known to need description. Like the satinwood tree above referred to, the tree appears to be liable to some imperfect distribution of the sap, which leaves veinings and blotches of light yellow in the larger proportion of the trees. It is then called bastard ebony, and it is of far lower marketable value than perfectly black sorts, though by many considered the more beautiful wood of the two. Its great weight and hardness, together with

CEYLON. the small average size of the trees, prevents its being used for any but ornamental purposes.

If this tree, in common with the satinwood and many others, takes root in a soil naturally poor or exhausted by previous growths, or by abandoned chena cultivation, it grows hollow and worthless for any but small work. The outward appearance of these trees is therefore no indication of its value.

Jack.—A common wood, but most useful for nearly all purposes; a bright yellow when newly cut, but it darkens to a rich mahogany colour by exposure and takes a magnificent polish. All the common descriptions of furniture are made of it, and its extensive use is causing it to rise in price; but as the fruit, which often in single specimens weighs 25 to 30 lbs., is prized as an article of food its cultivation is maintained. It does not grow wild as indigenous to the soil. It contains an acid which prevents its attack by white ants.

Suriya.—Commonly known as the Tulip, is a tree bearing a yellow flower. The Dutch planted it largely in every available position as a rapidly growing shade tree. Its roots have, however, so light a hold in the soil that it does not resist high winds in exposed situations. It is a gnarled and knotty wood, but admirably adapted for naves of wheels, to which purpose it is principally applied. Its sticks planted as a hedge grow very rapidly and closely, so much so as to cause legislative interference, in order to prevent obstruction of ventilation in thickly-peopled neighbourhoods. The prevalence of cholera some years ago in part of Jaffna was considered to be partly attributable to its close growth in narrow lanes, of which it formed the fences.

Teak.—The Ceylon variety does not possess the valuable properties of that grown in Burmah, and known as Moulmein Teak. It is, however, used where the latter would prove too costly, but is not a satisfactory substitute.

Calamander.—A beautifully grained wood. Rare and valuable, and used only for costly furniture, and can be obtained only in small scantlings.

Palmyra.—Is a palm of large size, and grows in immense quantities on all the coasts of the island.

It is of very slow growth, not attaining maturity under 100 years.

The wood of the female tree is comparatively worthless, and that of the male deteriorates rapidly after it has done bearing fruit.

But experiments prove it to be one of the strongest woods known. It is very dark in colour, and hard, and composed of closely packed fibres. Under breaking strain these

fibres can be heard to yield singly with a sharp report until the wood finally yields. It is impossible to assign limits to its durability, and when good seasoned wood, will perfectly resist the attack of white ants. It is largely used as rafters in unsupported lengths of 20 to 22 feet, but its great weight makes it a very heavy roofing material. The laths are costly in preparation, requiring extensive tool dressing. For piling in salt water it is invaluable, and will stand for 30 years in salt water without protection.

It is largely exported from the northern province, both to the south of the island and to India. It does not stand in combination with iron, both seeming to have an injurious reciprocal action.

Large bridges are built entirely of this material in the northern province, the longitudinal beams being formed of scantlings of it trenailed together.

Its antagonism to iron prevents its being used for sleepers for railway purposes. This is to be regretted as no other wood could be as durable, or be better for that purpose. It yields a nut which is prepared as an article of food, and dried to form a flour similar to arrowroot. It also yields "toddy" from its sap.

These woods, together with the sample of arrowroot and Rocella, are now in the Polytechnical Institute at Vienna.

COTTON.

The plant in its inferior varieties appears to be indigenous, and the "erekala," which is probably the least valuable, known from the shortness of its staple, is one of the most troublesome weeds in the Island. It roots itself in the hard compact gravel of a road, and is so prolific in its growth that several periodical clearings of it in a single year have to be made, especially in the northern province.

The cultivation of a better sort has been commercially practised by the natives, whose rude looms produce a coarse but strong cloth from it. It does not seem to have ever repaid European cultivation on an extended scale, but the introduction of the fine sea island variety, which produces a long and silky staple, may lead to its being attempted. This is similar in quality to what is extensively cultivated on the European shores of the Dardanelles.

As an old industry the growth and manufacture of cotton may take its place on the list of those of the island, but as a production fit for export it cannot yet be classed.

Thousands of square miles, however, of what is known as black cotton-soil remain now unworked, and are undoubtedly

CEYLON.

fitted for the plant. Especially is this the case in the almost depopulated districts on the north-western coast of the island. The heavy irrigation works of the old kings, constructed on a system of forced labour, by bringing together great numbers of uncleanly and ill-fed people, thus engendering disease, was mainly the cause of depopulating these districts, once teeming with population. Relapsed into jungle it will probably be extremely difficult to bring these lands again into cultivation, but with liberal encouragement settlement may ultimately be effected, and the growth of the finer sorts of cotton conducted practically without limit.

	Cotton exported.	Value.
1861	4,830 bags	25,587*l.*
1871	8,234 cwt.	30,741*l.*

Wood Industry.

Wood industry, baskets, &c.

All the fine plaited work is done by Singalese in the districts round the south-western coast, and is made of strips of leaves of varieties of plants dyed and finely plaited.

It is wonderfully cheap and durable, a set (12) of the Kalutara baskets costing a rupee, or 3*s.* The two sets sent to Vienna sold for about 3*l.* 15*s.* 0*d.*

Plaited baskets of Palmira palm leaf are made large enough for baths about three feet in diameter and two feet deep; they are double, the inner lining being from the leaf itself, and the outer skin from strips of the hard central rib of the leaf, termed "olah." They are plaited so closely as to be perfectly water-tight. They are made in other shapes too for lifting water from wells, and in the north are universally applied to this purpose. It is the best kind of basket and is very cheap. A bath such as is described would be about one to one and a half rupees.

They are strong and durable, and are used also on public works for carrying earth, baskets for this purpose costing 1¼*d.* each at Jaffna.

The same material is also woven into fine polished matting, a mat about 15 feet by 4 feet costing 8*d.*! and they can be made of any dimensions to fit particular rooms.

In addition to the above produce, boxes of Peasant jewellery, lent by the South Kensington Museum, were shown of which the following is a description:—

Jewellery Worn by Men.

Native jewellery. Men.

1. A pair of earrings, "Kuvalai," worn by all classes of the Tamils, though not by all individuals; the lobe of both ears are perforated and the jewel is hung on the hole, so that the ball of the ring is facing. They are worn on all

occasions, beginning from the time a young man passes his minority.

2. "Sevappoddu," as above.

3. Three pairs of earrings, called "Naddokkadukkan." These are worn in the same manner as above by the Tamils, mostly by those of country parts; hence they are called "Naddokkadukkan," which means earrings of the interior.

4. Two pairs of finger rings. They are called "Venmaddum" and "Kootheraykulampu." "Venmaddum" means plain work; "Kootheraykulampu" means horse-hoof. "Venmaddum" is worn in pairs on the ring finger, and the other on the little finger of the right hand.

5. Silver waist chain worn round the waist, inside the dress, to sustain a piece of cloth to cover the nakedness in bathing, &c.

JEWELLERY WORN BY WOMEN.

Native jewellery. Women.

1. Ear ornament, "Vaaly." The Tamil women, except the Brahmin class, and people from India and their descendants, wear this on ordinary occasions; the upper parts of the ears are perforated in such a way as to receive the joints of the two pieces of "Vaaly," and keep the ornament in a vertical position.

2. Five pairs of earings.—See explanation given for 1 and 3.

3. Ear ornament, "Kathuppu," worn in the ear, in the same hole in which earrings are worn, but this ornament stands over the earrings.

4. Nose ornament, "Mookuttie," in a bore on the left side end of the nose.

5. A necklace, "Karisamany." Several kinds of necklaces are worn by women, above the collar bone; but this is worn around the upper part of the neck.

6. A necklace, "Thaddumany," worn below "Karisamany."

8. A necklace, "Maniaddial," worn as an addition to "Karisamany," and sometimes instead of "Karisamany," but its place is between the "Karisamany" and "Thaddumany."

9. Wedding necklace, "Thaly" and "Charadoo," worn by women from the day of marriage during the life of their husbands. The meaning of the "Thaly" differs in object from that of wedding ring of other nations; the Tamil women wear it as a sacred mark to distinguish themselves from unmarried women and widows. "Thaly" is the round solid ornament in the middle of the gold string "Charadoo," which is worn in front.

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10. Silver arm-ring, "Kadasam;" bangles worn on the arm near the wrist.

12. "Valayal," worn as above—four on each arm.

13. Finger-rings, worn on the index finger, ring finger, and little finger of the left hand—from two to four rings on each finger.

14. "Kaal Motheram," or toe-rings, worn one on each of the four toes of both feet, except the big toe.

15. Five-stringed beads, worn round the neck to hang over the breast, the shortest string near about the collar bone.

16. Two-stringed beads, "Larye," worn beneath the five strings.

17. Hair-pins.

The colour of these jewels is not the natural colour of gold. The Tamils, being dissatisfied with its natural colour, give it an artificial one. The ingredients and the process employed for fixing the colour are the following:—After the jewel is made and completed it is heated, and then put into a solution of salt. The quantity of water used for the solution is just sufficient to cover the jewel. The gold then turns white, and is cleaned by rubbing it with soft white sand. The jewel is then put into a solution, composed of salt and alum in equal quantities, and in alum and saltpetre twice as much, and is treated till the whole solution is evaporated and slightly heated, when it assumes a yellow colour. It is then dipped in water and cleaned with soft white sand, and again heated in the last-named solution, cleaned with sand and polished.

This colouring is further carried on as follows:—A solution is made of acid of Gorga fruit or Tamarind, and a very slight quantity of brimstone, and what remains of the last solution, or rather its dregs, after evaporation, and heated. When the solution begins to boil the jewel is put into it, and moved about until the desired colour is obtained.

The silver jewels also admit of colouring. The process is nearly the same as in the case of the gold, but the use of brimstone is avoided, and they are principally dipped in a solution of lime.

In ancient times there were distinctions as to what jewels certain classes of people should wear, and what classes should not, and also as to town fashion and country fashion; but they are now worn indiscriminately by all classes of the people, and by the people of all districts.

A table showing the remarkable progress made by Ceylon since 1821 is annexed.

These results need no comment.

STATISTICAL VIEW of the PROGRESS of CEYLON for the Years specified in the annexed Table.

Year.	Area in Square Miles.	Population.	Estimated Number of Acres under Cultivation.	Revenue.	Expenditure.	Tonnage of Shipping entered and cleared. Total.	Imports.			Exports.		
							From the United Kingdom.	From other Countries.	Total.	To the United Kingdom.	To other Countries.	Total.
				£	£	Tons.	£	£	£	£	£	£
1821	24,700	—	—	459,699	481,854	—	—	—	—	—	—	—
1831		959,917	381,059	429,170	346,565	121,667	28,560	254,429	282,989	59,903	92,391	152,294
1841		1,365,779	809,984	344,465	361,326	218,793	183,161	496,509	679,670	253,870	114,513	368,383
1851		1,643,458	805,641	429,701	409,124	504,341	254,012	1,744,439	1,998,451	777,844	1,028,033	1,805,877
1861		1,919,487	810,153	751,997	*635,280	837,221	801,491	2,862,259	3,663,750	1,724,740	981,467	2,706,207
1871		2,405,287	1,402,556	1,121,679	†1,064,184	1,638,397	1,462,050	3,335,902	4,797,952	2,633,169	1,001,684	3,634,853

* This is exclusive of an expenditure of 19,759*l.* charged against the surplus revenue of former years.
† This is exclusive of an expenditure of 61,139*l.* charged against surplus funds and against balances.

CEYLON.

In conclusion, although the exhibition of Ceylon produce was as far as quality went excessively good, I must express my regret that it was not larger, and my concurrence in some of the views of the Colombo "Observer" as embodied in the following extract taken from its issue of the 14th October 1873:—

"It cannot be said that Ceylon, considering her position among British Crown colonies, was fairly represented at the Vienna Exhibition. Her wealth, variety of resources and productions, and the skill of various classes of her native handicraftsmen, as well as the enterprise of her European colonists, ought to have called forth a display of far greater extent and merit than that which was sent to the great world's show in the Austrian capital. . . . . The best mode would be, to collect with the view of holding a local exhibition of the articles intended afterwards to be forwarded to the European show. Local contributors are much more likely to come forward, if they understand that not only will the Government take their articles under its special protection in forwarding them to Europe, but that an opportunity for judging of their merits will be afforded to the public and their friends and acquaintances on the spot. We trust when the time comes, advantage will be taken to hold a local exhibition of the collection of products, &c., which is to form the nucleus of what will represent Ceylon in the permanent Colonial Exhibition at South Kensington."

The Committee in the Colony for the Vienna Exhibition were Mr. C. P. Layard, chairman, and Messrs. W. Rose, W. Ferguson, and G. Wall.

JAMAICA.

JAMAICA.

Jamaica is the largest, and was formerly the most valuable, of the British West India islands; it is situated in the Caribbean Sea, and to the southward of the eastern extremity of the island of Cuba, within N. lat. 17° 40′ and 18° 30′, and W. long. 76° 10′ and 78° 30′. It is 140 miles in length, and 50 in extreme breadth.

Discovery and settlement.

Jamaica was discovered by Columbus on the 3rd May 1494. He called it St. Jago. It remained in the possession of the Spaniards for 161 years, when it was attacked by a force sent by Cromwell, under Admirals Penn and Venables,

against Hispaniola. It capitulated, after a trifling resistance, on the 3rd May 1655. After the capture of the island, until the restoration of Charles II., Jamaica remained under military jurisdiction. In 1660 the first establishment of a regular civil government was made by Charles II., who appointed G. D'Oyley governor-in-chief, with an elective council. In 1670 peace was made with Spain, and the title of England to Jamaica was recognised by the treaty of Madrid. In 1807 the slave trade was abolished. At that time there were 323,827 slaves in the island. During the last eight years of the trade 86,821 slaves were imported. On the abolition of slavery in 1833 Jamaica received 6,161,927*l.* of the 20,000,000*l.* granted by the Imperial Government as compensation to the slave owners, being rather more than 19*l.* a head on a slave population of 309,338. JAMAICA.

There is great variety of climate; the medium heat at Kingston is about 80°, and the minimum 70° Fahrenheit throughout the year; at an elevation of from 4,000 to 5,000 feet the average range is 55° to 65°, the minimum in winter being 44°; on the Blue Mountain peak ice of some thickness has been found in March. The hurricane season ranges from July to October; the periodical rains, which last about six weeks, are called the May and October seasons; but there is great irregularity in the time of their falling. Climate.

Jamaica has been strongly recommended by the medical faculty of England, the United States, and Germany as a climate well suited for invalids and others threatened with chest complaints, or of delicate constitutions. Many invalids have visited the country and benefited by the change, and many remain, preferring the climate to that of their own land. Establishments for the reception of invalids have been opened in the Port Royal and St. Andrew's Mountains.

The island is calculated to contain about 2,720,000 acres. A range of mountains runs from east to west, occasionally rising to a considerable height, especially near the east end, where the Blue Mountain peak is about 7,400 feet above the level of the sea. Mr. J. Sawkins, F.R.G.S., from observations taken in July 1861, makes it 7,318 feet. On the north side the land rises into hills, often of remarkable beauty, and commonly separated from each other by spacious vales and romantic rivulets. On the south side the face of the country is more irregular and craggy, and several ridges of less elevation are formed, running nearly parallel to the principal Physical features.

JAMAICA.

one. Extensive plains or savannahs extend from the bottom of the lowest range to the sea. Much of the soil, especially in the higher mountains, is unfit for cultivation, and probably not more than one half of the land which the island contains has yet been granted to individuals.

The principal rock of Jamaica is a white limestone of recent formation. Some of an older date (graywacke, &c.) are to be met with in the mountains, chiefly in the county of Surrey and in the parish of St. Mary in Middlesex, as well as a great variety of those rocks (supposed of igneous origin) known to geologists under the general name of trap rocks. The remains of a volcano are distinctly visible in the parish of St. George.

Division of Island.

The island is divided, according to an Act of the Legislature passed in 1758, into three counties, namely, Middlesex, Surrey, and Cornwall.

Formerly these were subdivided into 22 parishes, but by an Act of the Council passed in 1867 the number was reduced to 14, viz.:—In Middlesex, St. Catherine, Clarendon, Manchester, St. Mary, and St. Ann; in Surrey, Kingston, St. Andrew, St. Thomas, and Portland; and in Cornwall, St. Elizabeth, Westmoreland, Hanover, St. James, and Trelawny.

Government.

The political constitution, as represented by the Legislative Council and Assembly, was abolished by an Act of the Legislature in 1866, when the island became a Crown colony. The constitution at present provides for a Governor, Privy Council, and Legislative Council, the latter consisting of 13 members, all appointed by the Crown, and of whom six besides the governor are paid officials.

Saint Jago de la Vega, or Spanish Town, used to be the seat of government, but it is now transferred to Kingston, which is the principal commercial city. It is here that the commerce of the island is centred, and from its favoured geographical position, as well as from its spacious natural harbour, one of the finest in the world, it offers a convenient port of call to the many lines of steamships now trading in these waters. Fresh provisions, vegetables, water, coals, and every other necessary for steam or sailing vessels, can be procured readily at very moderate rates. The other principal seaport towns are—Port Morant, Morant Bay, Salt River, Milk River, Black River, and Sav-la-Mar, on the south coast; and Lucea, Montego Bay, Falmouth, St. Ann's Bay, Port Maria, Annotto Bay, and Port Antonio, on the north side.

Population.

The population, according to the census of 1871, was 506,154, as follows :—

—	Males.	Females.	Total.
White - - -	6,909	6,192	13,101
Coloured - -	48,048	52,298	100,346
Black - - -	191,498	201,209	392,707
Total - -	—	—	506,154

In 1861 the total population was 441,264.

FINANCE.

Finance.

The actual results of the financial year 1871–2 were :—

	£
General revenues - -	405,227
General expenditure - -	380,982
Surplus - -	24,245
Appropriated revenues - -	54,797
Expenditure - - -	45,627
Surplus - -	9,170
Gross surplus -	33,415

The immigration fund account is not included in the above figures. Its revenue and expenditure for the year were as follows :—

	£
Revenue - - -	34,540
Expenditure - - -	62,269

The following table gives the whole of the Treasury receipts of the year 1871 and 1872, as compared with those the two years immediately preceding :—

JAMAICA. Revenues, &c.

COMPARATIVE STATEMENT of RECEIPTS for the Years 1871–2, 1870–1, and 1869–70.

	1871–2.	1870–71.	1869–70.
	£	£	£
Import duties and fees	224,077	193,226	193,341
" " " additional	—	9,447*	—
Tonnage dues	—	6,934*	—
Light dues	2,905	2,461	3,161
Excise, rum duty	86,171	75,254	78,264
" spirit licenses	15,765	13,305	13,567
Trade licenses (old)	817	502	466
" " (new)	7,203	6,506	7,132
Stamps	13,528	12,076	11,482
Land tax on main roads	8,772	8,191	7,349
New property tax	4,826	4,788	4,319
Poor rate, house tax	24,912	22,978	17,229
Parochial road tax: horses and wheels	24,821	26,338	20,940
Tax on stock	—	—	3,203†
Dog tax (new)	183	120	137
Post office	—	13,640	13,068
Interest	4,135	4,096	—
Miscellaneous	28,022	25,253	24,380
Total revenue	460,024	408,734	414,418
IMMIGRATION REVENUE.			
Export duty	22,686	20,007	22,557
Capitation tax, &c.	9,679	7,287	3,548
Interest	2,175	1,855	—
RECEIPTS ON DEBT ACCOUNT.			
Excess of deposits in treasury over withdrawals	74,471	—	8,236
Immigration loan	13,400	30,000	—
Grand total receipts	582,435	467,833	448,759

The great increase in the amounts received for import duties in 1871–2 was due to the renewed improvement in trade.

The recovery in the trade of Jamaica commenced in 1868, and there is every reason to expect that the upward progress will continue.

With the exception of the horse and wheel tax for parochial roads, every item of revenue last year shows an increase over the corresponding item in 1870–1.

* *Ceased from April 1, 1870.* † *Abolished from August 1, 1870.*

TRADE.

Trade.

The value of the imports for each of the last seven years, excluding the value of railway materials imported in 1866–7, 1868–9, 70–71–2, was :—

	£
1866 - -	1,030,796
1867 - -	859,186
1868 - -	1,012,279
1869 - -	1,224,414
1870 - -	1,300,455
1870–1 - -	1,331,185
1871–2 - -	1,559,602

The value of the principal articles of export for the last seven years has been :—

Exports.	1866.*	1867.*	1868.*	1869.*	1870.*	1870–1.	1871–2.
Sugar, hogsheads -	33,637	31,206	36,259	29,268	30,747	37,010	35,353
Rum, puncheons -	18,754	18,834	20,274	15,270	16,897	19,376	20,113
Coffee, lbs. - -	8,413,532	6,264,864	7,758,985	5,025,812	9,047,284	5,508,989	9,510,739
Pimento, lbs. - -	4,866,239	7,595,800	4,873,259	6,575,249	5,243,109	6,857,830	5,140,898
Dyewoods, fustic, and logwood, tons -	36,570	48,481	49,129	118,678	84,744	59,941	80,699
Ginger, lbs. - -	1,550,166	1,728,075	2,036,921	1,261,873	680,492	632,031	509,766
Arrowroot, lbs. - -	70,204	44,566	27,346	11,371	6,343	5,820	13,193

Sugar.

The quantity of sugar exported in 1871–2 though less than that of 1870–1, when there was much the largest sugar crop that there had been for 19 years, was above the average. This is evidence of improving cultivation, and in a less degree of increasing cultivation. The increase also in the quantity of coffee is partly due to the increasing industry and enterprise of the small settlers, who are extending their cultivation of this important staple. The high prices which coffee has commanded lately has been most advantageous to the colony. Several sugar estates during the last year were purchased by wealthy Cubans, who, abandoning their own island, settled themselves in Jamaica. The skill, industry, and enterprise of these settlers must indirectly benefit the whole colony.

Tobacco.

The cultivation of tobacco according to the Cuban system has made a satisfactory start, and is increasing.

By the returns of the collectors of taxes it appears that in August 1871 there were only 91 acres of this cultivation; there are now more than 300 acres. The increase is principally in the parishes of St. Andrew, where the cultivation is carried on by Jamaica owners, and in the parishes of St. Catherine, St. Thomas, Portland, and St. Mary, where

* These figures are for the calendar year.

JAMAICA.

it is carried on mostly by Cubans who have settled and become the owners of property. Both Cuban and native labour are employed in the cultivation; but Cuban labour alone is employed in the manufacture. As yet the tobacco grown in the island is for the most part made up into cigars and snuff for island consumption. But the reports made of cigars sent by way of experiment to the London market are satisfactory. There can be little doubt that tobacco will soon be a great staple of export. The quality is certainly good. There is nothing to prevent Jamaica cigars equalling those exported from Havannah.

In 1870 a prize of 250*l.* was offered for the best tobacco produced in Jamaica by any one cultivator of not less than eight acres, producing 400 lbs. of cured tobacco from each acre. This prize was equally divided between two competitors in 1872. These were the first producers in Jamaica of tobacco as an exportable article.

Manufacture of cigars.

Cigars were the only produce of Jamaica exhibited at Vienna, and they received the medal of merit. Messrs. Soutar & Co., of Kingston, sent 2,000 of different sorts, which were excellent both in quality and in make. They formed quite a feature in the colonial annexe, and five times that number could have been sold as samples had they been placed at my disposal.

The plantations of Messrs. Soutar are 15 miles from Kingston, and were established four years ago upon a soil similar by analysis and in a climate corresponding with that of the famed Vuelta Abajo district in Havanna. Their seed was also received from and is of the description grown in Vuelta Abajo. Their manufactory is in Kingston, where they constantly employ 100 hands in the preparation of the tobacco and the manufacture of cigars and cigarettes. The cost of freight from Jamaica to Great Britain is about 3*s.* per 1,000 cigars, and to the continent from 3*s.* to 3*s. 6d.*

Persons disposed to question the value of Jamaica tobacco frequently stated to me that transplanted tobacco changes its character, and that therefore the cigars could not be as good as Havannas. The impression that it changes in character is correct. That delicate aroma found in the Vuelta Abajo tobacco is not derived from the seed, but from the nature of the soil, the climate, and the temperature.

When first establishing plantations in Jamaica some five years ago Messrs. Soutar were of course aware of this fact, and tried the growth in three different localities all sown with the same seed, which was obtained from one of Partaga's plantations in the district of Pilotes in the Vuelta Abajo.

One plantation gave a very good quality, another a tobacco similar to that grown about Santiago-de-Cuba, and the other a strong but flavourless leaf, each differing according to the soil and climate, although all were cured in the same way. It was not until they had obtained a correct analysis of the soil of the Vuelta Abajo, together with a record of the temperature, and other meteorological phenomena, that they met with any degree of success, and indeed it is only now that they have been able to secure a property having all these conditions.

This year's crop appears better than last, and Messrs. Soutar are confident that next will be equal to the finest Vuelta Abajo.

I have had much pleasure in forwarding several large orders to Messrs. Soutar from Vienna, and I am convinced that if through these orders they obtain a footing in Germany, a prosperous future will be in store for them.

Remarks on prospects of tobacco cultivation.

Sir J. Peter Grant, the Governor of Jamaica, with whose name the increasing prosperity of Jamaica will ever be associated, reports that in the Castletown Gardens "plots of "Manilla, Havanna, Kentucky, and Latakia tobacco have "been grown. The first and last of these tobacco plants "seem to thrive peculiarly well. The sudden spring that "the cultivation of tobacco has just taken in the colony "renders the question of tobacco seed one of great interest "and importance. Our garden must possess all the most "highly-prized varieties of this plant. But from all I can "learn, Jamaica has as good a right to send tobacco seed "abroad as any other place has. I have heard of a pre-"ference being given to the seed of Jamaica plants to seed "imported from Havana of the same variety. And I have "heard of Cuban settlers here who have pronounced the "quality of some leaf now growing here, upon plants "whereof the cultivation happened to have been attended "to with the needful care and skill, to be already equal in "size and quality to that of the best Cuban leaf.

"For a few years past the superintendent of our Botanic "Garden has been distributing here small packets of tobacco "seeds at the rate of 200 packets a year. These packets "contain five varieties of seed originally procured from "Kew.

"I cannot mention Kew without observing that infinite "as have been the services of Dr. Hooker to every part of "the British empire, there is no spot in that empire which "has greater reason for gratitude to that eminent man than "this island of Jamaica."

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Botanic gardens.

Great improvements in the Botanic Gardens are reported by the Governor. A fern house has been completed, and he states that the natural stream by which the gardens at Castletown are watered has been regulated, and a handsome tank has been built for the Victoria regia. Something has been done towards giving the more ornamental part of the garden generally a more finished appearance than it had.

Sugar canes.

Sugar Canes.—Nearly 60 varieties, the survivors of 90 varieties of canes, were received in 1873 from Mauritius, new to Jamaica. These will be extensively multiplied, and subjected to experiment, with a view to test their comparative values.

Applications have also been made for more than 12,000 cuttings of the Salangore cane, which will be available for sale in the course of the year.

Sarsaparilla.

Sarsaparilla.—An acre of this plant has been established, very much with the view of ascertaining how far cultivation and selection will improve its quality. Experience has shown that this root, produced in certain districts of Jamaica, realises higher prices than that produced in other districts. Yet no specific distinction in the plants is perceptible.

Chocolate, &c.

Chocolate, Cacao.—This valuable product, which more than a century ago was largely cultivated in Jamaica, now meets with very little attention. It is peculiarly well suited to many places in the island. With a view to excite attention to it, an acre of this plant has been established at Castleton under the shade of plantains, and this little plantation will be extended.

Nutmegs.

Nutmegs.—This plant seems to be now more prized in the Island than any other exotic, judging from the number of applications made for plants. The tree has been introduced for 40 years or more, and it produces fruit of the finest quality and in great profusion; whilst large tracts in parts of the island where it is unknown are admirably adapted for its cultivation. It is believed that there are not more than 50 bearing trees now in Jamaica. Most of these are in the neighbourhood of the old botanical gardens at Bath, in St. Thomas. The nutmeg trees in Castleton are beginning to bear, and the propagation of the plant by seedlings is commencing upon what will soon be a fair scale.

Pine apples and oranges.

The new varieties of pine apples and oranges, and the lately imported Bombay mangoes, are doing very well indeed (the mangoes especially), and are in course of being propagated as fast as possible. It is possible that the finest

varieties of the Bombay mangoe will become, in time, an article of export to New York, producing an enormous profit to those who may have the forethought to establish orchards of this unsurpassed fruit in suitable spots. The vanilla also thrives at Castleton, and the flowers are artificially fertilised with complete success. The true pepper plant has been introduced, and does well. The true mangosteen tree is thriving; whether it will bear fruit or not remains to be seen. The small ipecacuanha plants are doing perhaps a little better than last year. JAMAICA. Vanilla. Pepper, &c.

Some plants of the Indian teak and other valuable Indian timber trees have been raised from seeds obtained from the Calcutta garden. Teak.

Palms.—A comparatively large addition has been made this year to this great family. Four years ago there were only 20 species of palms in the Botanic Garden, in which not even the palms indigenous to Jamaica were fully, or nearly fully, represented. The collection now numbers nearly 100. The area of cultivation devoted to the palmetum is yearly increasing. The introduction of new species of commercial and economical value has been specially attended to. All the palms hitherto obtained from both sides of the world promise to thrive extremely well at Castleton. There is nothing to prevent the palmetum there becoming, in time, and at an inconsiderable cost, as fine as any in the world. The area now occupied by palms planted out and of such a size as to be at all conspicuous is but a small portion of the area intended for this family. Already, however, it is the most striking feature of the garden. Palms.

It further appears from the Government reports that the total area now planted in chinchona plantations is 200 acres. Much more land has been cleared, and more land would have been planted; but unfortunately many thousands of the young seedlings were attacked by an epidemic disease which destroyed them. This disease only appeared amongst the very young seedlings. When it ceased those that survived appear to have suffered no injury; but the numbers immediately available for planting out were greatly reduced. Cinchona,

Bark from each of the five varieties possessed in Jamaica was sent home to be analysed in London by a distinguished authority on the subject of quinine. He stated that the result was "highly satisfactory as regards the prospect of "cinchona cultivation in Jamaica." He further reported that "the C. calisaya has already attained a per-centage of

JAMAICA.

"quinine which would fit it for the purposes of the manufacturer."

The trees which produced the bark thus described were only plants of three years old.

There is some difficulty in forming an accurate idea of the state of progress of agriculture and commerce in Jamaica in former years.

Exports of principal produce.

Sugar was the great staple of the island, and was produced for the last few years of the 18th century at an average rate of upwards of 90,000 hogsheads a year. The abolition of the slave trade in 1807 affected the production, but about 120,000 hogsheads may be taken as the ordinary yield for the next 15 years.

In 1855 the crop did not reach 30,000 hogsheads. In 1809 the total exports were valued at £3,033,234

In 1854 - - -	932,316
In 1870–1 - -	1,196,532

A table showing the quantity and value of the principal exports of the five years, 1831 to 1835, is annexed, and is interesting.

	Sugar.		Rum.	
	hogsheads.	£	puncheons.	£
1831	94,881	1,233,453	36,411	400,521
1832	98,686	1,282,918	33,685	370,535
1833	95,101	1,106,313	34,976	384,736
1834	84,756	1,101,828	32,111	353,221
1835	77,970	1,013,610	27,530	302,830

	Coffee.		Pimento.	
	lbs.			
1831	222,56,950	445,139	5,500,620	45,838
1832	14,055,350	281,107	3,172,320	26,436
1833	19,815,010	396,300	4,024,800	33,540
1834	9,866,860	197,337	8,423,100	70,192
1835	17,725,731	354,514	3,731,400	31,095

	Ginger.	
	cwts.	£
1831	15,213	30,426
1832	14,416	28,822
1833	21,032	42,064
1834	21,534	43,068
1835	26,575	53,150

Present position of trade as compared with past times.

Although Jamaica is not dependent on the exports of sugar and rum, these figures clearly demonstrate the falling off that has occurred in the trade and the financial prosperity of the colony as compared with earlier years. It must be acknowledged that the production of the export of sugar is disproportionate to the natural capabilities of the island, to the relative productions of other West India islands, and to the

production of Jamaica itself in times past under an artificial system of protection. JAMAICA.

The fact is that the want of adequate labour has prevented Jamaica from competing with those countries in which from slavery or other causes there is a sufficient supply. Labour.

The history of the island since emancipation has not been encouraging to the friends of liberty. The negro, on whom the cultivation of the land principally depends, has gradually given up labour, and appears to be retrograding in the social scale.

He can in a short time earn sufficient to enable him to purchase a patch of freehold, upon which he squats. The land owing to its fertility yields him with a very little cultivation all he requires to maintain him in tolerable comfort, and he works for hire only when it is necessary for him to do so.

In these circumstances it is evident that the only way by which Jamaica can hope again to attain to its former prosperity is by the introduction of a large supply of immigrants.

In 1870–1, 1,354 immigrants arrived, and in 1871–2, 1,188 landed. It is believed that there are already between 10,000 and 11,000 Indians in the colony. About 1,600 immigrants were entitled to return passage or bounty in 1872, and only 420 elected to return to India. Thus three fourths of those entitled to a free passage have elected to accept the bounty secured to them and become free settlers in the island. Application for 2,666 coolies for this year has been received. This large and increasing proportion of coolies who prefer settling in the country to returning to India with a free passage, is a good feature of the system in force in the island, and a favourable augury for the future. It must also be observed that irrigation continues to increase, and the preparation of sugar by the centrifugal and other improved methods is becoming very general throughout the colony. Immigrants.

Agricultural labour is still very much wanted in several districts of the island, but employers hesitate to apply for immigrants on account of the high rate they have to pay for them, in addition to the export duty on produce, and the expense of medical attendance, food, &c., until they get acclimatized.

The importation of immigrants into Jamaica was suspended from 1863 to 1867. In June and July of the latter year

JAMAICA. 1,625 coolies were introduced from Calcutta, but these are reported not to have given entire satisfaction to the planters.

Prices and wages. *Price of Provisions.*—Yams, from 4*s.* to 5*s.* per cwt.; cocoas, 3*s.* to 4*s.* per cwt.; plaintains, 2*s.* to 3*s.* per 100; sweet potatoes, 3*s.* to 4*s.* per cwt.; rice, 18*s.* to 21*s.* per cwt.; flour, 3*d.* per quart; corn meal, 2½*d.* to 3*d.* per quart; salt fish, 3*d.* per lb.; salt pork, 9*d.* to 1*s.* per lb.; fresh pork, 4½*d.* to 6*d.* do.; fresh beef, do. per lb.; herrings, four for 3*d.*; sugar, 2½*d.* to 3*d.* per lb.; bread, 3*d.* per lb.

The average weekly earnings of indentured coolies are from 5*s.* 6*d.* to 5*s.* 10*d.* for males, and from 4*s.* 2*d.* to 4*s.* 11*d.* for females, when employed on day labour; and from 4*s.* 9*d.* to 6*s.* 4*d.* for males, and 3*s.* 9*d.* to 5*s.* 10*d.* for females, when employed on task work; but it is the usual custom for the employer to grant leave to those who may desire it for the whole, or at all events, the half of each Saturday, a concession which the coolies invariably avail themselves of.

Summary. Favoured with a salubrious climate and a most fertile soil, Jamaica abounds with every variety of tropical fruits, which are produced in the greatest profusion and without cultivation. Oranges, bananas, and pines find a ready and profitable market in the United States.

The supply of sugar, ginger, pimento, and rum is only limited by the absence of labour and of cultivation.

There is, however, a marked improvement in the commercial and agricultural condition of the colony; and there is no reason why with its increasing revenue, and a constant and large supply of cheap imported labour, the island should not again be one of the most prosperous in the world.

It is to be hoped that at the next great exhibition Jamaica will make a larger exhibit of her varied produce than she did in 1873 at Vienna, and that her cigars, which excited so much interest and curiosity there, may in the meantime be ranked as worthy of comparison with the best Havannah brands.

The show case for Messrs. Soutar's cigars is now in the International Exhibition, at South Kensington, where it is understood that that firm intends to make a permanent exhibition of its tobaccos.

MAURITIUS.

Mauritius is a small island in the Indian Ocean just within the tropics, about 500 miles east of Madagascar, being situate in 20° to 20° 30′ south latitude, and in longitude east 57° 17′ to 57° 46′.

Formerly in the possession of the French, and known as Ile de France, this island became a Crown colony of Great Britain by capitulation in 1810.

Physical features.

It is entirely of volcanic origin, and viewed from the ocean presents a most picturesque appearance. Indeed by recent writers Mauritius has been styled the "Gem of the Ocean."

Port Louis is the capital of, and the only city in, Mauritius. It contains about 63,000 inhabitants, and covers an area of about 10 square miles.

It is surrounded on the land side by a ridge of mountains which takes the form of a horse shoe round three sides of the city, and has a fine natural harbour, capable of affording anchorage to a large number of vessels.

The mountains in the island, which consist of basalt, tufaceous rock, and lava, vary in height from 2,000 to 3,000 feet. In the centre of the island the table land has an elevation of about 1,500 feet above the sea, the distance from the coast being about 15 miles. In the south and south-west portions the features of the country are rugged. The districts in the centre of the island are flat, or slightly undulating, and are covered with a red ferruginous earth. The soil where it is cultivated is unusually rich and fertile, but it varies greatly in character, and speedily becomes exhausted. Of late years many thousands of acres in the low-lying lands in the north and north-western districts, which were formerly very productive in their sugar yield, have become waste and unemployed; and it is a question open to discussion whether this has occurred from improvident working of the estates, from scarcity of rain, or from exhaustion of the soil.

The mean temperature in the shade for groups of five years has been proved to be about 77°.

MAURITIUS.

Area. The total area of the island is 432,680 acres, or about 708 square miles, of which there are under—

Cane cultivation about -	-	230 square miles.
Planted with maize, manioc, &c. -	25	,,
Forest and pasture -	-	168 ,,
Waste and uncultivated -	-	285 ,,
Total -		708 ,,

Population. For so small an area the population of Mauritius is extraordinary. According to the census of 10th April 1871 it amounted to 316,042 souls, or 446 per square mile (against 180,823 souls in 1851), whilst that of Great Britain and Ireland is estimated at 253, and that of Belgium, the most populous country in Europe, at 430 per square mile. The population is very mixed Persons of every nationality are found in the island. Although a British dependency the proportion of English residents bears a very small ratio to the rest of the inhabitants. Out of the population of 316,042, it appears that of colonists born in the United Kingdom there were only 964, of those born in India 148,300, and of those born in Mauritius 143,938. America and Australia, France, China, Mozambique, &c., claim the remainder.* Between 1843 and 1873 403,050 Indian immigrants have been introduced into the colony.

Public health. With regard to the health of the colony, the acting Governor recently wrote as follows: "I am afraid it would "be fallacious to expect that what with its over-populated "state, to which thousands are annually added, and with a "malarial fever that has already so terribly proved what "malignant power it can assume, always lurking in an "endemic form through the island, it will be ever likely "again to resume its once celebrated salubrity."

The deaths and death-rate of each of the three years, from 1869 to 1871 inclusive, in the total population have been—

1869 -	-	35·0 per 1,000.
1870 -	-	22·0 ,,
1871 -	-	25·0 ,,

Produce. The welfare of the community depends entirely upon the cultivation of a single staple article of valuable produce. With the exception of sugar, the colony raises scarcely anything required for its own consumption, but exports nearly its whole product, and *imports* all articles required

* Census Returns, 1871.

for its food and for its other necessities. Everything grown is sent to Port Louis for exportation, and everything required on the estates is brought back from that town. Until some few years ago the sugar from the estates near the coast was conveyed to Port Louis by schooners, and from other parts of the island it was carted to town by mules. These carts conveyed about 30 or 40 cwt. of sugar each, and required three or even four mules; but in ascending from Port Louis to the centre of the island the return load only averaged about 12 or 13 cwt. per cart. Conveyance by schooners though cheap depreciated the sugar, owing to exposure, and to the losses consequent on transhipments and pillage, while the cartage was for the reasons mentioned very expensive, notwithstanding the excellent condition of the roads.

Railway communication.

The necessity for railway communication was therefore much felt by the Government, and after careful investigation the construction of a railway was recommended to and adopted by the English Government in May 1861. It was at first hoped that a private company would undertake it, but as no suitable offer was made it was decided that the works should be carried out by the local Government, the funds being obtained from some large balances in hand, and by the issue of 1,000,000*l.* of colonial debentures, bearing interest at six per cent., and secured by a sinking fund. The total sum which the colony thus became responsible for was at the outset 78,000*l.* a year.

The Mauritius railways consist of two lines, the North and Midland, having a common terminus in Port Louis. The north line 31 miles in length runs to Grand River S.E., and was opened for traffic in May 1864. It comprises 8¾ miles of cutting, 26 miles of embankments, and 14 bridges varying from 25 to 80 feet in span, built of stone or iron.

The maximum gradient on this line is 1 in 80 feet. The highest level attained is 329 feet above the sea.

The Midland line traverses the centre of the island, and attains an elevation of 1,822 feet above the sea level. The total length is 35 miles, and the gradients are exceptionally steep, 1 in 27 constantly occurring. In all there are 21 bridges, the most remarkable of which is the viaduct over Grand River, in five spans of 126 feet each, and 140 feet above the bed of the river.

MAURITIUS.

Revenue and expenditure.

REVENUE AND EXPENDITURE.

1855 -	£348,453 -	£317,839
1856 -	395,103 -	326,581
1857 -	451,209 -	380,501
1858 -	553,166 -	521,514
1859 -	609,516 -	572,479
1860 -	553,419 -	500,853
1861 -	482,788 -	468,849
1862 -	492,322 -	584,495
1863 -	550,618 -	528,546
1864 -	638,067 -	602,279
1865 -	646,730 -	667,716
1866 -	639,576 -	700,048
1867 -	534,992 -	642,602
1868 -	577,686 -	641,272
1869 -	595,024 -	575,180
1870 -	608,166 -	591,579
1871 -	616,952 -	600,961
1872 -	703,159 -	650,327

Public debt, 1,100,000*l.*, bearing interest 6 per cent.

The mean revenue of the island for the 10 years ending 1872 was 611,097*l.*

The mean expenditure for the same period was 640,051*l.*

Trade.

IMPORTS AND EXPORTS.

1855 -	£1,356,301 -	£1,848,091
1856 -	2,154,406 -	1,804,123
1857 -	2,391,106 -	2,303,786
1858 -	2,785,352 -	2,209,076
1859 -	2,440,821 -	2,559,699
1860 -	2,238,846 -	2,661,098
1864 -	2,582,979 -	2,249,740
1865 -	2,141,350 -	2,629,519
1866 -	2,048,000 -	2,501,000
1867 -	1,720,000 -	2,003,800
1868 -	2,000,069 -	2,321,243
1869 -	1,619,906 -	2,601,657
1870 -	1,953,993 -	2,049,987
1871 -	1,807,382 -	3,053,054
1872 -	2,437,512 -	3,177,301

The value of imports and exports since 1866 is exclusive of specie.

The quantities and value of sugar exported during the five years ending with 1871 were—

—	Tons.	Value.	Average Price per cwt.
		£	s. d.
1867 - -	100,000	2,156,950	18 4
1868 - -	99,000	2,143,166	21 10
1869 - -	107,000	2,599,815	22 10
1870 - -	102,000	2,549,881	24 11
1871 - -	123,000	2,819,944	22 7

The following table shows the exports of that article in 1872:—

EXPORTS of SUGAR from the Colony of Mauritius in the year 1872.

	Countries to which exported.	Quantities. Produce and Manufactures of the Colony. In British Vessels.	In Foreign Vessels.	Total.	Value in Sterling.		
		lbs.	lbs.	lbs.	£	s.	d.
Sugar.	United Kingdom - -	101,333,498	1,688,774	103,022,272	1,092,847	18	0
	Australasia - - -	68,770,616	17,144,118	85,914,734	1,024,388	0	6
	Cape of Good Hope - -	1,646,592	1,167,095	2,813,687	29,528	5	1
	Continental India - -	16,398,394	3,873,482	20,271,876	240,638	0	0
	Dependencies of Mauritius	131,894	10,521	142,415	1,820	13	0
	St. Helena - - -	53,560	—	53,560	770	0	0
	Denmark - - -	981,956	3,149,446	4,131,402	39,450	0	0
	France - - -	8,296,549	11,051,237	19,347,786	228,182	6	0
	Italy - - - -	3,147,307	760,495	3,907,802	48,613	0	0
	Spain - - - -	6,810,323	—	6,810,323	39,497	6	0
	Sweden - - - -	1,281,201	—	1,281,201	12,700	0	0
	Madagascar - - -	15,743	651	16,394	208	9	0
	Zanzibar - - -	29,843	—	29,843	320	0	0
	Muscat - - -	—	57,345	57,345	700	0	0
	Pondicherry - - -	—	33,824	33,824	449	3	0
	United States - -	3,927,313	—	3,927,313	38,108	0	0
	Chili - - - -	1,873,045	—	1,873,045	19,000	0	0
	Total - -	214,697,834	38,936,988	253,634,822	2,817,221	0	7

In 1845 the total amount exported was only 45,600 tons.

The only produce and manufactures of the colony besides sugar and rum which were exported during last year, were—

Aloes fibre, 4,275 cwt.
Cocoa-nut oil, 253,918 gallons.
Silk cocoons, 2 lbs.
Vanilla pods, 7,563 lbs.

The sugar estates are rather more than 200 in number, and there are upwards of 70,000 Indians settled on them.

The total immigrant population in the colony on the

MAURITIUS. Coolies on estates.

10th April 1871, was 153,703, 109,173 males and 44,530 females; but by deaths and departures that number was reduced in December 1871 to 151,985.

The average cost of introduction of coolies charged to employers was in 1871, 9*l.* 15*s.* 10*d.* per male adult from Calcutta, and 11*l.* 5*s.* 6*d.* per male adult from Madras.

On the 10th April 1871, the Indian population on the sugar estates was as follows, according to the census taken on that day:—

—	Males.	Females.	Total.
Immigrants:			
From Calcutta - - -	36,815	12,836	49,651
„ Madras - - -	18,086	9,090	27,176
„ Bombay - - -	5,035	2,143	7,178
Indo-Mauritians - - -	16,192	14,863	31,055
Free Indian passengers - -	40	12	52
Total - - - -	76,168	38,944	115,112

The mortality on sugar estates since 1869 has been as follows:—

1869 - -	3,701 = 30	per 1,000
1870 - -	2,352 = 16	„
1871 - -	2,841 = 21	„

The estates of Plaines Wilhems gave the lowest death-rate, and those of Rivière du Rempart the highest:—

Plaines Wilhems	- 16	per 1,000
Rivière du Rempart	- 25	„

Of the 75,885 men engaged in 1871 within the colony, 47,713 re-engaged themselves to the employers they had already served. Those who changed masters numbered 28,172.

Cultivation of the sugar cane.

THE SUGAR CANE.

The cultivation of the sugar cane is peculiarly exposed in Mauritius to injury from hurricanes, as well as from insect plagues, two of which, the "borer" and the "poua pache blanche," are particularly destructive; the former insect is furnished with a horn like a screw by means of which it perforates the canes. It was estimated in 1861 that the sugar crop fell short by 20,000 tons of what it would otherwise have been, owing to the destructive agency of this caterpillar.

The sugar canes when ripe are about 12 ft. high and 2 in. in diameter. As soon as the plant blossoms the leaves begin to wither and die, and the cane changes its colour.

The sugar cane in its different stages was perfectly illustrated in the representations painted from nature in Queensland, New South Wales, and Mauritius which were exhibited at Vienna. MAURITIUS.

The cane having ripened, is cut, tied up in faggots, and conveyed to the mill, where it is crushed by means of cylindrical rollers, the juice falling into large vats placed for its reception beneath.

In no part of the world has the manufacture of raw sugar been brought to a higher state of perfection than in Mauritius. Every improvement, alike in the process as in the necessary machinery, which modern science has brought to light, has been eagerly taken advantage of regardless of expense. Manufacture of sugar.

The "modus operandi" in the manufacture of sugar is now so generally known that it is needless here to refer to it in detail; suffice it to say that on almost every estate the vacuum pan system, by which an immense saving in time is effected, is now adopted. When granulation has taken place, the time allowed for which varies according to the size of crystals it is sought to produce, but may be said to be about four hours, the sugar is allowed to run out through wooden troughs into large iron tanks to cool, and afterwards passed through the "turbines" (centrifugal machines), which revolving at the rate of 1,000 rotations per minute, eliminate all the syrup from the sugar.

During this process water is added in more or less quantity, according to the degree of whiteness which it is desired to obtain.

For the last three years, to obtain a more perfect degree of whiteness in the crystallised descriptions of sugar, a system has been pretty generally adopted known as the "procédé Icery," so called from its owing its origin to the Honorable E. Icery, M.D.

It consists in the use of mono-sulphite of lime for the better purification of the veson (cane juice). The "clairce," after leaving the battery, being treated by this process previous to passing into the vacuum pan.

The syrup as it issues from the turbine is collected in reservoirs, to be again brought back to the vacuum pan, producing sugars known as 1st, 2nd, or 3rd syrups.

The residue or molasses is finally appropriated to distilling purposes.

Since the introduction of steam mills and machinery the cultivation of the sugar cane has nearly superseded all other kinds of agriculture. In many places plantations have been rooted up to make room for the more lucrative cane, and in others, where the land from exhaustion has become unpro-

MAURITIUS. Extension of cane cultivation and its results.

ductive, hundreds of acres of the primæval forest have been recklessly cleared away for the same purpose. The interesting meteorological statistics and tables sent to Vienna by Mr. Meldrum of the Royal Observatory, show that although the rainfall for several years past has not been on the whole of much less amount than formerly, it is confined in a great measure to particular localities and the higher parts of the island, instead of being general, thus leaving many districts either entirely without or with an insufficient amount for cane cultivation. Mr. Meldrum calls particular attention to the destruction of the forests as a means of increasing the temperature and decreasing the rainfall. He calculates that at least 70,000 acres, or about one sixth of the entire area of the island, have been denuded of forest since 1852, and that, too, on the central and elevated parts at or near the sources of the rivers, and in the neighbourhood of swamps and marshes, close to which sugar plantations have been lately commenced. It requires no instrumental observations to show that the climate in the interior of the island is much drier than it was some years ago, and as this state of things is prejudicial to the health of the population as well as to the cultivation of the sugar cane, he recommends, as far as practicable, the restoration of certain portions of the forests of which this once beautiful and salubrious island has been deprived.

The yield of canes in August 1873 was satisfactory. The greatest activity was displayed on all the estates. The cane disease, which was thought earlier in the year to be spreading to the different estates, made no progress, and was restricted to a few. Wherever, however, it appeared it made heavy ravages, and its effects were only partially compensated for by the superior yield of the new species of canes recently introduced into the colony. I do not know the actual produce of the crop of 1873, but the general impression amongst the most experienced planters and merchants was that it would reach about 130,000 tons.*

A collection of 14 samples of sugar was sent to the Vienna Exhibition by Mr. James Wiéhe from different estates in the colony, and three samples of "vesou" sugar crystallised in the vacuum pan, filtered and manufactured without animal charcoal, and purged by turbines, were forwarded by the Honorable H. Pitot, as well as a second lot of samples treated in the same manner as above, with much larger crystals, which were made from the syrup or refuse from the "vesou" sugars. To the eyes of the most un-

* From telegraphic information it appears that this amount has not been realized, and that the crop will be about 100,000 tons.

initiated it was evident that these sugars belonged to the first class. They could not be surpassed in the perfection of their refining and the regularity of their crystal cubes, and nearly all received either medals of merit or honorary distinction. MAURITIUS. Exhibits at Vienna.

FIBRES. Fibres.

The Mauritius stall was decorated with specimens of 60 different fibres supplied from the Royal Botanical Gardens; many of them are deserving of special notice, not only on account of their merits, but in consequence of the frequent enquiries respecting them, and the applications I received for samples from French and other manufacturers.

Those most valuable are the "Fourcroya gigantea" and "Agave americana," both much used in the manufacture of ropes. The "Sanseviera cylindrica," "Zeylanica," and "Latifolia" are also extremely valuable, and are said to yield the strongest known fibre. The Gomuti, from the trunks of "Arnaga sacharifera," is likewise an exceedingly useful fibre, and is much used as a substitute for horsehair in stuffing cushions, &c. The process of manufacture was at the outset of the most primitive character. Leaves of the aloe were cut and steeped in sea water on the shore in holes dug for the purpose.

When sufficiently steeped these leaves were beaten with sticks and rubbed with stones to remove all the pulpy matter, the fibrous portions being then again frequently washed and bleached in the sun.

The favourable results obtained from the first trials speedily led to a further development of this industry, which now promises to become important and remunerative. Hitherto the aloe, growing wild in most of the uncultivated parts of the island, has sufficed; but of late those persons who have seriously occupied themselves in the matter have commenced regular plantations, both by transplanting the young plants and also by raising seedlings.

Great improvements have also been effected in the mode of preparation, but there is no doubt that in this respect much yet remains to be done. The more improved method of preparation is by passing the leaves through rollers similar to those used for crushing the sugar cane, with this difference, that the cylinders employed for crushing the leaves of aloe are furnished with teeth, or more correctly speaking scrapers, so that not only is the leaf crushed, but a certain portion of the pulpy refuse at the same time removed.

A great saving in time, as also in manual labour, is thus effected. The fibre is then thoroughly cleansed by steeping, and dried and bleached in the sun.

MAURITIUS. Fibres. There were also exhibited six sizes of rope made from the aloe fibre; this is a comparatively new industry in Mauritius, but is rapidly developing. The fibre is much esteemed in England and meets with ready sale. The price depends entirely upon the more or less care with which the fibre is prepared, and consequently varies very considerably, say from 20*l.* to 42*l.* per ton. Some which was exceedingly well prepared has lately realised as high a price as 50*l.* per ton. The aloe fibre combines extreme lightness with great strength.

WOODS.

The specimens of timber, 63 in number, 46 of which were from indigenous trees, are also worthy of more than passing notice.

Those most remarkable are:—

Timbers.

1. "Labourdonnasia glauca," used for house and ship building, cabinet and furniture work. Barks good for tanning and dyeing.
2. "Colophonia mauritiana," a resinous, heavy wood, much used for framing of carts, felloes of wheels, and in some parts of shipbuilding, breaks for railways, carriages, and waggons. This is a large tree which often attains a diameter of six feet.
3. "Jossinia lucida," a slow-growing tree. Wood very hard and heavy, much used in building, and named from its extreme hardness.
4. "Labourdonnasia revoluta," good for all building purposes. These several kinds of "Bois de Nattes" are not excelled in durability by any other kind of wood.
5. "Olea lancea," an elastic wood good for shafts, tool handles, &c.
6. "Memecylon trinerve," seldom of large size. The wood is excellent, and much esteemed by carpenters for handles to axes, &c. It is very elastic; diameter 6 to 8 inches.
7. "Syzygium." This tree produces wood of excellent quality and useful for many purposes.
8. "Sideroxylon cinereum," a tall, straight, and durable tree some five feet in diameter. Used for house-building, planks, shingles, and is almost indestructible if cut in the proper season.
9. "Mangifera indica," often attains a large size. The wood is light but tough, and is used for doors, packing cases, &c. It is scarcely possible to draw nails out of it.

10. "Heriteria littoralis," a large tree wood, excellent, close grained, and dark coloured; makes beautiful furniture. MAURITIUS.
11. "Acacia alata," said to be stronger than teak. Heart wood excellent, hard and durable, useful for many purposes, and stands a heavy strain.

There are many other specimens equally deserving of notice if space admitted, but sufficient has been stated to show the value of Mauritius woods, and the various purposes for which they can be used. The collections of woods and fibres, which were honoured with the medal of merit, have been handed to Dr. Hochstetter for presentation to the principal museum at Vienna.

Fruits and Spices.

Fruits.

The fruits of Mauritius are the mangoe banana, custard apple, and avoca, the guava, letchi, mabolo, and tamarind. The pine apple also grows to perfection. The variety is very great, and the finer kinds are not anywhere surpassed in size, beauty, or flavour.

The selections of preserved fruits sent to Vienna were not at all satisfactory; most of them had fermented, and nearly half the bottles were broken on their journey to the exhibition.

Spices.

The principal spice trees in the colony are cloves, and nutmegs. Excellent samples of the two former products were exhibited by Mr. Horne, of the Royal Botanical Gardens, and they have also been handed over by Dr. Hochstetter for presentation to the Vienna museum.

Cotton, sago, betel, ginger, pepper, camphor, and vanilla also flourish in Mauritius, and pods of the latter plant are exported in small quantities.

The lithographs of canes, and the sugar canes painted from nature, which have already been mentioned, together with the photographs of types of the Chinese, Indian, and Mozambique inhabitants of Mauritius, and views of landscapes in that colony, have by my direction been forwarded to this country for the purpose of being placed in the colonial annexe of the International Exhibition, where they will doubtless form the nucleus of a very interesting collection.

The manioc, cassava, and arrowroot are not grown in sufficient quantities to export. They are produced more for home consumption.

Madagascar Produce.

Madagascar products.

Amongst the articles sent to Vienna were a few specimens of Madagascar products, which derived interest from

MAURITIUS. the fact that by them alone was represented that large and rich country, hitherto so little known in commercial circles.

Trade between Mauritius and Madagascar. In writing of Mauritius one can nowadays hardly refrain from some allusion to Madagascar, as almost the entire trade with Europe is carried on through Mauritius.

Exports from Madagascar are for the present restricted to oxen (for the supply of Mauritius and the neighbouring French colony Reunion) rice, hides, india rubber, and various gums and fibres.

The principal articles of import are, cotton manufactures, salt, rum, hardware, and gunpowder.

A large trade both in imports and exports is carried on all round the coast by American traders.

Some idea may be formed of the growing importance of the trade with Madagascar by a reference to the following statistics of that with Mauritius.

EXPORTS from MAURITIUS to MADAGASCAR.

	Cotton manufactures.	Rum.
	£	£
1867 -	- 18,296 -	- 4,660
1868 -	- 24,106 -	- 3,305
1869 -	- 18,080 -	- 1,340
1870 -	- 32,846 -	- 4,620
1871 -	- 50,070 -	- 11,119
1872 -	- 48,990 -	- 20,262

India rubber. India rubber is now exported in large quantities both to America and Europe. The following table shows the great development of this trade with Mauritius alone.

	£
1867 - - -	- None
1868 - - -	- 387
1869 - - -	- 282
1870 - - -	- 12,932
1871 - - -	- 31,310
1872 - - -	- 84,252

The rubber being for the most part unskilfully prepared is inferior to Para, and compares rather with that exported from Penang. Its value in the London market at present is from 1*s.* 4*d.* to 1*s.* 9*d.* per lb.

Fibres. Of the fibres of Madagascar that most appreciated is the raffia fibre, much esteemed in Europe, the present value of which is 65*l.* to 70*l.* per ton.

Silk. Silk is produced in Madagascar in some quantity, but has not yet become an article of export. A recent attempt to send cocoons to Europe signally failed, owing to the want of skill with which they had been prepared.

The silk lambas exhibited proved not only the quality of the silk, but much skill in manufacture, and also the excellency in Malagash dyes.

Madagascar is known to possess untold wealth in the form of coal mines, gold, silver, and other minerals, and there is little doubt that ere long great treasures will be brought to light.

It is to be regretted that the Seychelles and some of the other dependencies of Mauritius did not send articles to Vienna for exhibition.

CONCLUSION.

From these few statistics it will be seen that Mauritius, a small colony of 432,680 acres, has become by the energy and enterprise of its inhabitants, one of the most prosperous and important sugar-growing colonies of the British Crown, and that the annual value of that produce is over 2,500,000*l*.

In view of the injury to which the sugar crop is so constantly exposed, it is gratifying to observe that within the last few years new industries, although small, in the way of cocoa-nut oil, vanilla pods, timbers and fibres, are gradually coming into notice. Anxiety for the future must invariably be felt by any community so long as it relies solely on a single staple produced mainly by the aid of an alien and ever-changing population. Mr. Charles Bruce was the chairman of the committee in this colony for the Vienna Exhibition.

NEW ZEALAND.

The colony of New Zealand consists of three principal islands, called respectively the North, the Middle, and the South or (Stewart's) Island, and several small islets (mostly uninhabited), the chief of which are the Chatham Isles and the Auckland Isles. The three principal islands extend in length 1,100 miles, but their breadth is extremely variable, ranging from 46 miles to 250 miles; the average being about 140 miles.

Area.

The North Island is about 500 miles long, and contains about 29,688,000 acres; the Middle Island 550 miles long, and about 28,422,000 acres; and Stewart Islands 30 miles long, and about 1,000,000, thus giving a total of 58,110,000 acres. New Zealand has therefore an area one third less than that of Great Britain and Ireland.

NEW ZEALAND.

Provinces.

It is divided into nine provinces, viz., Wellington, Auckland, Hawke's Bay, Taranaki, Nelson, Otago, Canterbury, Marlborough, and Southland.

Climate.

From its healthy and salubrious climate, from its great extent of coast line, and from its position with regard to the neighbouring continent of Australia, New Zealand is often called "the Great Britain of the Southern Hemisphere." The temperature is, however, much more equable than in the British Isles. While the summers are as cool as those of England, the winters are as warm as those of Italy. The mean annual temperature at Auckland is nearly the same as at Rome; at Wellington, nearly the same as at Milan; at Dunedin, nearly the same as at London. The official reports of the Medical Department show that whereas the annual mortality from all diseases out of every 1,000 British soldiers quartered in the United Kingdom was 16, it was only five out of every 1,000 in the troops quartered for more than 25 years in New Zealand. In other words, this colony appears to be much more favourable to human life than is the mother country.

Aborigines.

The aborigines, calling themselves Maories, are a very remarkable people, a branch of the Polynesian race. According to their own traditions, their forefathers came about 600 years, or 20 generations ago, from Hawaiki, which was probably Hawaii in the Sandwich Islands, or Savaii in the Navigator or Samoa group. They are divided into about 20 different clans, analogous to those of the highlands of Scotland. There have been two Maori wars; the first lasted from 1845 until 1848; the second lasted from 1860 with little intermission until 1870. But fully half the clans have always been friendly to the English; and many of them have fought on the side of the colonial Government against their own countrymen. Tranquillity appears to have been established in 1871 throughout the country. It was estimated that the Maories did not exceed in that year 37,500, of which number all dwell in the North Island, with the exception of about 1,500 scattered over the other islands.

Government.

A constitutional form of government was established in New Zealand by the imperial statute 15 & 16 Vict. cap. 72, passed in 1852. By that Act the colony was divided into six provinces, since increased to the nine just mentioned, each governed by a superintendent and provincial council, elected by the inhabitants according to a franchise which practically amounts to household suffrage. Every provincial council is chosen for four years, but can be dissolved, like

the central Parliament, by the governor. The superintendents are also elected for four years.

All the productions of the temperate climates of Europe or Asia can be cultivated with great success in New Zealand. There are extensive gold mines and rich gold fields.

Population. 1861, 1871, &c.

The population of New Zealand (exclusive of the aborigines) was estimated in 1871 to be 266,986, having increased from 99,021 in 1861. The population of the chief towns (including their suburbs), was in 1871, in round numbers, as follows:—Wellington (the seat of the general Government), 8,000; Dunedin, 21,000; Auckland, 20,000; Christchurch, 12,000; Nelson, 6,000.

Revenue for same period.

The revenue, the trade, and the other elements of material prosperity have increased during the same period in nearly equal proportions. Thus the revenue was in 1860, 464,739*l.*; 1870, 1,384,639*l.*; 1871, 1,342,116*l.*; 1872 (year ending 30th June), 1,967,854*l.*, and the imports, 1,548,333*l.*; exports, 588,953*l.* 1870, imports, 4,639,015*l.*; exports, 4,822,756*l.* 1871, imports, 4,078,192*l.*; exports, 5,282,084*l.* 1872 (year ending 30th June), imports, 5,142,951*l.*; exports, 5,190,665*l.*

Trade, ditto.

The Public debt of New Zealand in 1873 was 10,369,736*l.*

Lands and crops.

LAND AND CROPS. (*Lands and cultivation of aboriginal natives not included*).—The extent of holdings in the colony in February 1871, was returned as 22,764,498 acres, against 18,762,057 acres in December 1867, viz.: freehold, 5,637,838 acres, against 5,068,440 acres in 1867, and leasehold, 17,126,660 acres in 1871, against 13,693,617 acres in 1867. The total number of acres fenced was 6,778,773, against 3,455,588 in 1867. The quantity of land broken up but not under crop was, in 1871, 116,204 acres, against 94,311 acres in 1867. The total quantity of land under crop, as shown by the census of 1871 (including sown grasses) was 1,042,042 acres, against 676,909 acres in 1867. In this total were 77,082 acres of wheat, against 47,786 acres in 1867; 123,135 acres of oats, against 101,563 acres in 1867; 23,071 acres of barley, against 13,136 acres in 1867; 12,901 acres of potatoes, against 14,372 acres in 1867; 776,402 acres of sown grasses, against 472,893 acres in 1867. In other crops there were 29,450 acres, against 27,159 acres in 1867.

The large amount of grass lands, which this year (1873) is said to amount to 1,003,000 acres, must be taken in a measure as evidence of want of sufficient population to cultivate the more productive cereals.

The statistics, however, exhibit a remarkable degree of

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progress, which points to a great future for New Zealand as a grain-producing country. It appears that nine-tenths of the grain raised throughout the colony was raised in the provinces of Otago and Canterbury.

ANNUAL PRODUCTION OF BUTTER AND CHEESE.—The annual production of butter in the colony, according to the returns of February 1871, was 5,199,072 lbs., against 3,834,252 lbs. in 1867; and of cheese, 2,547,507 *lbs.*, against 1,300,082 lbs. in 1867.

Live stock.

LIVE STOCK.—The aggregate number of live stock of all kinds (excepting poultry) in 1871, was 10,382,540, against 8,924,520 in 1867. Taking the principal kinds of live stock separately, the numbers were—horses, 81,078 in 1871, against 65,615 in 1867; cattle, 436,592 in 1871, against 312,835 in 1867; sheep, 9,700,629 in 1871, against 8,418,579 in 1867; and pigs, 151,460 in 1871, against 115,104 in 1867.

Immigration and emigration.

IMMIGRATION.—The immigration to New Zealand in 1871, amounted to 10,083 persons, of whom 7,526 were males, and 2,557 were females. Of the males 6,892 were adults, and 634 children; of the females 2,066 were adults, and 491 children. The following figures show the immigration in 1871, classified according to the countries from which the immigrants arrived:—United Kingdom, 1,769 males, 1,368 females; total, 3,136. Australian colonies, 2,925 males, 1,111 females; total, 4,036. Other British Ports; total 2,388. Foreign States, 445 males, 78 females; total, 523.

Shipping, &c.

TRADE AND INTERCHANGE.—SHIPPING.—The numbers and tonnage of vessels entered inwards and cleared outwards at the several ports of New Zealand during the year 1871 were as follows:—The total inwards was 729 vessels, of 274,643 tonnage. The total outwards was 719 vessels, of 265,618 tonnage. Of the total of 729 vessels inwards, 52, of 39,725 tonnage, arrived from the United Kingdom; 561, of 189,753 tonnage, from the Australian colonies and other British possessions; and 116, of 45,165 tonnage, from foreign countries (including the southern whale fisheries). Of the total of 709 vessels outwards, 87, of 55,899 tonnage, belonged to the United Kingdom; 567, of 166,927 tonnage, the Australian colonies and other British possessions; and 55, of 43,117 tonnage, to foreign countries. Of the 729 vessels inwards, 100, of 61,296 tonnage, were

British; 569, of 167,276 tonnage, colonial; 49, of 44,250 tonnage, American; 2, of 273 tonnage, German; 7, of 1,141 tonnage, French; 1, of 1,356 tonnage, Danish; 1, of 51 tonnage, Fijian.

Comparative value of trade, 1869-1870.

IMPORTS AND EXPORTS.—The total value of the imports of the colony in 1871 was 4,078,193*l.*, against 4,639,015*l.* in 1870, being a decrease of 560,822*l.*, or 12·08 per cent. A comparison of the total value of imports in 1870 and 1871, according to the countries whence they were received, gives the following results:—

	1870.	1871.		
United Kingdom	£2,685,736	£1,808,636	decrease	£877,100
British Colonies	1,759,872	2,112,063	increase	352,191
Foreign States	193,407	157,494	decrease	35,913
Totals	4,639,015	4,078,193	decrease	560,822

The total value of the exports from New Zealand in 1871 was 5,282,084*l.*, against 4,822,756*l.* in 1870, being an increase in 1871 of 459,238*l.*, or 9·52 per cent. Excluding the value of imported goods re-exported from the colony, the total value of exports of New Zealand produce and manufactures in 1871 amounted to 5,171,104*l.*, against 4,544,682*l.* in 1870, being an increase of 626,422*l.*, or 13·78 per cent. The two very important exports—gold and wool—demand more particular notice here. The total value of the gold exported from New Zealand in 1871 was 2,787,520*l.*, produced by the several gold fields to the following amounts, viz., Auckland, 2,188,708*l.*; Marlborough, 7,468*l.*; Nelson, 439,936*l.*; county of Westland, 531,646*l.*; Otago, including Southland, 619,760*l.* The total value of gold exported in 1870 was 2,157,585*l.* There appears therefore a net decrease in 1871 amounting to 629,935*l.* The increase in amount occurred in Auckland and Marlborough, while in Nelson, Wellington, Westland, and Otago there was a decrease. The total quantity of gold exported from New Zealand from the 1st April 1857, to the 31st December 1871, was 6,272,878 ounces; the total value, 24,252,999*l.* The total quantity of wool exported in 1871 was 37,793,734 lbs., against 37,039,763 lbs. in 1870, being an increase of 753,971 lbs. The total value stated for 1871 was 1,606,144*l.*, against 1,703,944*l.* in 1870, showing a decrease of 97,800*l.*, or 5·73 per cent.

Trade for year ending 30th June 1872.

Returns for the year ending the 30th June 1872 have just been received.

The total exports and imports were for that year re-

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spectively, 5,190,665*l.*, and 5,142,951*l.* The chief articles of export were:—

Wool	value	£2,500,000
Gold	„	1,730,000
Kauri gum	„	155,000
Wheat	„	112,000
Oats and barley	„	67,000
Preserved meats	„	162,000
Flax	„	100,000
Hides and tallow	„	120,000
Timber	„	30,000

The chief articles of import were:—

Wine, spirits, and beer	value	£352,000
Vegetables and fruit	„	110,000
Drapery	„	690,000
Wearing apparel	„	150,000
Boots and shoes	„	196,000
Cottons	„	86,000
Sugar	„	380,000
Coals and coke	„	170,000
Iron	„	160,000
Railway materials	„	180,000
Agricultural machinery and tools		74,500

That a population of little more than 266,000 can absorb such a mass of commodities without glutting the market indicates a high standard of living, and a prevailing condition of profitable employment throughout the community.

Exhibits at Vienna.

COAL.

Coal.

The first exhibits which appear in the New Zealand catalogue are 13 specimens of coal of the kinds known as bituminous, anthracite, pitch, semi-bituminous, glance, and brown coal. It appears that coal is being worked in at least five provinces, viz., Nelson, Canterbury, Christchurch, Auckland, and Otago.

The most important coal mine in the colony is said to be that at Grey River on the Nelson side, the seam of which is about 6 feet thick. This mine is being largely developed, and supplies nearly all the steamers trading to the Greymouth Township. The coal is of superior quality, nearly equal to Newcastle. Next is ranked the Kawa-Kawa coal mine, six miles inland from the Kiri-Kiri River, which is navigable for vessels of 60 tons. Commodore Wiseman reports that this coal is of a superior quality, and equal to that of New South Wales for steaming purposes. It is also equally well adapted for the generation of gas. The thick-

ness of the seams vary from 6 to 16 feet, and they crop out on the sidings in different places.

Coal resources of colony.

The examination and development of the coal resources of the colony are being prosecuted as vigorously as is consistent with due caution, so as to avoid the misdirection of capital.

The principle adopted has been to give substantial assistance in those cases where there is a fair prospect of obtaining a supply of steam coal.

In other cases small grants have been placed at the disposal of local committees formed for the purpose of exploring coal deposits, which though valuable in the localities where they occur are not likely to acquire colonial importance. Inquiries are being made with a view if possible of utilizing the brown coal in working the railways in parts of the colony, and with every probability that a large quantity will hereafter be used in the locomotives.

It may be inferred that New Zealand is extremely rich in coal. The discoveries that have already been made can only be considered as a beginning of what future years will bring to light more abundantly.

New Zealand has coal of very different geological ages, and of very different qualities. All stages from lignite to anthracitic black coal are represented. Whilst the pitch coal will probably be found to be most useful for locomotive purposes, the brown coal will probably be ultimately found to be most suited for manufacturing and domestic purposes.

GOLD.

Gold and minerals.

The next exhibits in the catalogue are gold, minerals, and ores.

It appears that the value of the yield of gold in New Zealand up to the 31st December 1872 has been:—

From the North Island -	- £2,563,307
From the South Island -	- 23,250,953
Total -	£25,814,260

In the North Island the gold is obtained by lode mining, and in the South it is chiefly obtained by alluvial washing. Gold was first discovered in the province of Otago in 1861. It is now found in large quantities along the west coast, extending from 60 miles south of Hokitika to the Buller 80 miles from Nelson, a distance of nearly 140 miles, and back as far as the dividing range, which in some instances is from 60 to 80 miles from the coast.

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It is stated that up the Grey River the claims are exceedingly rich.

Gold diggings.

In the province of Otago, besides the alluvial diggings, which are worked on an extensive and systematic scale, a number of comparatively rich and easily worked quartz reefs have been discovered.

Dr. Hochstetter reports that the gold from the Otago gold fields is partly granular or gunpowder like, partly in scales or nuggets, or crystallized. It exhibits every degree of intermixture and variety of each of these forms or kinds in different localities. It is associated with titaniferous iron sand, iron pyrites, tin ore, topaz, garnets, and other minerals. The original matrix of the gold is quartz, and the latter occurs interbedded in or associated with metamorphic states.

The first discovery of gold was made at Coromandel, in the province of Auckland, about the year 1852, but it was not till some 10 years later that it was found in payable quantities. A population of from 20,000 to 25,000 then rapidly located itself in the district, and the Thames and Coromandel gold fields turned out to be the richest in the colony.

Of the first 10 specimens exhibited at Vienna it is to be noted that they are the produce of ground sluicing at an elevation of from 100 to 1,400 feet above the sea level. From Teviot two nuggets were exhibited, and a third, weighing 18 oz., has been recently obtained.

Dr. Hector, director of the Geological Survey in New Zealand, was of opinion some few years ago that the surface had been only scratched, and that opinion was fully borne out by the subsequent discovery of the Caledonian and Golden Crown mines, the former being one of the richest in the world. The total area in the South Island in which gold has been found is about 1,500 square miles.

In the beginning of 1864 gold was discovered in the northern end of the island in the province of Marlborough, on the banks of the Wakamarina and its tributaries. Three months after the discovery 3,000 men were all engaged in digging, and many of the claims proved wonderfully rich.

One of the richest gold fields in the colony was shortly afterwards discovered in the province of Canterbury, on its west coast.

Looking to the great increase in the amount of gold exported, it may be confidently assumed that the country only requires to be thoroughly prospected to have this valuable mineral brought to light in still larger quantities.

It is believed by geologists that the gold-bearing zone extends obliquely across the whole of the North Island, but the attitude assumed by the native tribes of the interior has hitherto prevented anything like a systematic search for it.

These special difficulties do not exist in the South Island, but nevertheless a large portion of the country has yet to be explored.

Silver.

SILVER.

Silver has also been found in various places.

At the Vienna Exhibition there was a fine specimen of nearly pure silver weighing over 10 oz., which had been extracted from Thames gold, province Auckland, by what is known as the chlorine refining process. The gold having been separated by this process, the chloride is reduced to metallic silver by the galvanic action of iron plates and acidulated water.

Iron and Steel.

IRON.

Amongst the most prominent minerals from New Zealand exhibited at the Vienna Exhibition were the iron ores, iron sand, and titanic steel.

From "Stevens and Bartholomew's Directory," and from the report by Mr. Kelly upon the resources of Taranaki, it appears that the titaniferous iron sand found in such large quantities, and so widely spread on the sea coast of New Zealand, is capable of yielding iron of the highest quality, and that the metals which have been manufactured there from have proved in the comparative tests to which they have been submitted fully equal in tensile strength and general character to the most celebrated English irons. The applicability of titaniferous iron to the improvement of lower class manufactures, as well as its great value as a distinct article of trade, is generally acknowledged. The ore is found in various states of purity according to the action of the winds and tide, which under certain conditions effect the separation of the ore on a large scale from the ordinary silicious sand with which it is mixed, when it can be obtained by thousands of tons in an almost absolute state of purity.

It is stated that some English ironmasters have recently bought a large tract of country with a view of developing this industry.

From tests made at the works of Messrs. Parker, of Tipton, South Staffordshire, it has been proved that with iron from the New Zealand sand, $1\frac{1}{4}$-inch rounds made into links for cables were capable of bearing a tensile strain of

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52 tons before breaking. On analysis this iron sand is found to consist in every 100 parts of—

Peroxide of iron - -	88·45
Oxide of titanium with silica -	11·43
Loss - - - -	·12=100

The Colonial Government has offered a bonus of 5,000*l.* for the first 1,000 tons of pig iron of marketable quality.

Copper ores.

COPPER ORES.

Copper has been worked to a limited extent at the Dun Mountains, 17 miles inland from Nelson, and one of the specimens exhibited at Vienna of "cupreous iron ore" came from that locality. Dr. Hochstetter in his work on New Zealand states that in 1856, 16 tons of excellent copper ores, principally red and native copper, were shipped to England by the Dun Mountain Copper Co.

The copper ore does not occur in a regular lode, but only in nests and bunches. The richer deposits of ore form lenticular shaped masses, which when followed may increase to a certain distance, but then disappear again in a thin wedge. When these nests are large and rich, one alone may sometimes make the fortune of a mine. The richest in the Dun Mountain appears to have been that of Windtrap Gully, from which pieces of native copper, some of them weighing as much as 8 lbs., were extracted.

The occurrence of the best indications of copper ore over a continuous line of about two miles affords good ground for supposing that considerable quantities of ore are contained in the mountain; but on the other hand, owing to the manner in which the ores occur in isolated bunches, mining operations must always be conducted with a less chance of certain profit than when the ore occurs in a regular lode.

Chromate of iron.

CHROMATE OF IRON.

Much energy and exertion have been devoted to the successful working of the chromate of iron, which occurs also in the Dun Mountain range.

Whole groups of rocks on the sides of the wooded peak consist of almost pure chrome ore and there is no doubt that the lodes of this ore continue with more regularity than in the case of the copper ore.

In addition to the ores to which I have referred, specimens of the following were exhibited at Vienna, which testify to the mineral wealth of the colony, viz., lead ores, zinc ore, and manganese ores.

PETROLEUM.

Petroleum.

Petroleum specimens were forwarded from Sugar Loaf Point, Taranaki, Waiapu, east coast of Auckland, and Waipawa River, Poverty Bay.

It appears that in the first-named locality, in consequence of bituminous indications about Sugar Loaf Hill, a few enterprising men sunk a shaft in search for petroleum. After sinking to a considerable depth their efforts were crowned with success. Wells have been bored to a depth of many hundred feet, but although the petroleum is of good quality, no steady supply of oil has been obtained.

It is stated that several other springs have been found, in which case petroleum may yet prove a source of considerable wealth to the colony.

BUILDING STONE, &c.

The next items included in the official catalogue were building stone, fireclay, &c. Mr. Barclay, in his Notes on New Zealand, states that limestone and building stone are found in many localities. Marble and granite, of various colours and qualities, are found chiefly on the west coast of the South Island. In Auckland many of the buildings are of scoria from Mount Eden, an extinct volcano, but limestone for building and farming purposes is within easy distance by boat, or road, or railway. The Oamaru white stone (South Island) is quite celebrated, and has been exported in large quantities to different parts of New Zealand, and even to Melbourne. It is used for ornamental and monumental work of all kinds. Cement of good quality can be made from cement stones and the volcanic tufas that are found in different parts of both islands.

GRAIN AND AGRICULTURAL PRODUCE.

Agricultural produce.

There was a very fair representation of grain and agricultural produce from New Zealand at Vienna. As will be seen from the statistical portion of this article, the breadth sown in grain is not large, but nevertheless the yield, weight, and quality of the produce are good. Samples of wheat grown by Mr. Campion, in the province of Canterbury, were exhibited which weighed 67½ lbs. to the bushel. In some districts of the Waikato, on only middling land, an average of as much as 58 bushels of wheat to the acre has been gathered.

The barley and oats were excellent samples of their kind, and looking to the amount of land under those crops, it would seem that to those two cereals and to grass seeds the

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agriculturists in the colony have turned their particular attention.

Wool.

WOOL.

The great wealth of the colony does not, however, lie in its gold and other minerals, or in its cereal produce, but in its wool. New Zealand possesses nearly 10,000,000 sheep, that is nearly 40 sheep to each head of the population. These sheep are not the coarse-woolled animals with which we are in England familiar, but in many cases the bearers of a long close fine wool, of which some magnificent specimens were sent to Vienna.

Long-woolled ewes have recently been selling in Auckland at from 3*l.* to 4*l.* each, and common sheep at from 7*s.* to 12*s.* each.

Exports.

The total quantity of wool exported in 1870 was 37,039,763 lbs., of the value of 1,703,944*l.* In 1871, 37,793,734 lbs., value 1,606,144*l.* In 1872 there were imported into England from New Zealand 33,719,756 lbs., valued at 2,069,980*l.*

Sheep farming.

The sheep in New Zealand have hitherto been mostly of the Merino breed. The original stock was introduced from New South Wales, which first imported Saxon sheep. Since then most of the Australian colonies, but principally Victoria, Queensland, and Tasmania, have furnished breeding stock to the New Zealand settlers, the most prominent of whom have taken care to preserve and cultivate the original Merino blood by systematic crossing with superior German rams. For some time past, however, and especially during the last few years, the introduction of English, Leicester, and Lincoln sheep into New Zealand has been carried to such an extent that hardly less than 30 per cent. of the flocks must at present be cross-breds. The climate suits this class of sheep, whose big frames and heavy shearing weight appear to yield the grower in many cases more satisfactory results than the shorter and finer Merino flocks. It is, however, worthy of notice that while the great increase of cross-bred wool cannot but depreciate its value sooner or later, the stationary and almost retrogressive production of fine Merino "combing" tells already very effectively in the opposite direction.

Quality of wool.

As to the quality of New Zealand wool it may be observed that all wool grown in that colony is adapted for combing purposes. The quality of the Merino-bred flocks is of good but not of extreme fineness, the climate being apparently too cold for the production of a very superior quality, such as is attained to perfection in the famed western districts of Victoria. The staple is generally of good length, stout grown, and sound, as was indisputably

proved at the Vienna Exhibition. Most New Zealand wools have the advantage of a good colour, and a fairly faultless condition. The cross-bred wool is irregular, and as a breeding experiment the cross-bred sheep is, so far as has been proved, not very perfect. The long and coarse fibre is often of common character, the staple not sufficiently compact in growth, and devoid of lustre.

There are, indeed, highly creditable exceptions, but, as in the case of Merino wools, so must here the labours of the squatters of Victoria and South Australia be considered as the guiding models.

Except, perhaps, in the River Plate country, whose production appears as boundless as its plains, the growth of wool has nowhere increased in so extraordinary a degree as in the Australian colonies. It will suffice to compare their present exports with those of 10 years ago.

Comparative exports.

In 1862 the total export of wool from Australia and New Zealand was 225,015 bales, against 522,709 bales in 1872, showing an increase of 132 per cent. In the case of New Zealand wool alone the figures are even more startling. In 1862 the export was 26,658 bales; in 1872, 104,584, or an increase of about 293 per cent. in 10 years.*

Putting the present net average value of a bale of Australian wool at 20*l.*, it appears that more than 10,000,000*l.* worth of wool was imported from those colonies into England last year. Of this sum rather over 2,000,000*l.* fall to the share of New Zealand, for the Board of Trade returns for 1872, which have already been quoted, state the quantity exported from the colony in that year to have been 33,719,756 lbs., and the value 2,069,980*l.*

So far as the production of wool depends on the growth of native grasses, it may be said that it has reached its extreme limit in the southern island, as the best lands in that part of the colony are fully stocked. But in the northern island, there is still room for expansion, as thousands of acres only await the extended cultivation of English grasses to become fitted for the further increase of this already enormous export.

PHORMIUM TENAX

Phormium tenax.

Or native flax, is a most valuable article of commerce. This plant, which is indigenous to the soil, and the growth of which is so luxuriant and rank as sometimes to attain the length of nine feet, is found in large quantities in New Zealand. When in bloom the Phormium tenax is beautiful and highly ornamental. The flax has been in use

* On this subject, see also article on Cape of Good Hope, page 139.

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Native flax.

amongst the natives from time immemorial; from it they prepared their clothing, mats, nets, and baskets. Within the last few years a great quantity has been manufactured into ropes and cordage in New Zealand, and a large quantity has been imported into this country, where it commands from 30*l.* to 42*l.* per ton, according to its measure of preparation.

Mr. Alex. Kennedy, in his work on New Zealand, states that of "all our colonial productions it can in the shortest "time, and with the least employment of capital and labour, "be converted not only into an article of immediate and "universal domestic use, but as a commodity of export. As "the supply of raw material is inexhaustible, and the "demand for the manufactured article fortunately likewise "unlimited, no danger is to be apprehended of overstocking "the market. As daily experience proves that the price "and demand will increase with the quantity and quality "produced, it will therefore continue to increase in quantity "and improve in quality from year to year, until eventually "it will form a source of no end of wealth."

In 1865, 15 bales were exported; in 1870, 32,820, the value of which was estimated at 139,578*l.*

The dressing is either by cold or warm water. The leaf is fed to a machine called a stripper, at the rate of 100 to 120 feet per minute. The drums of these stripping machines are driven at the rate of 1,000 to 2,000 revolutions per minute, their diameter being from 14 to 20 inches.

After passing through strippers the partially cleaned fibre is handwashed. The bundles are allowed to soak, are dried, and then either "scutched or hackled," and packed in bales and pressed for shipment.

A new mechanical appliance of a very simple kind has recently been invented for separating the fibre and delivering it in a clean state without the necessity of scutching or hackling. It is believed that this will materially lessen the cost of production, and thus promote the further development of this important branch of colonial industry.

Some beautiful rugs, mats, and satchels of native manufacture were exhibited at Vienna, as well as enormous coils of rope made from this flax.

Woods.

TIMBER.

The forests of New Zealand are magnificent, and abound with all kinds of valuable timber, consisting of kauri, red and white pine, rimu, totara, birch, rata, &c. Of these the kauri is by far the most valuable. In Auckland the kauri grows so luxuriantly that trees of 20 feet in circumference at the base are numerous. It is used for house and ship build-

ing, bridges, furniture, machinery, and a variety of other purposes. It is very durable, and its qualities only require to be known to be appreciated.

Some of the above-mentioned trees attain to a height of 150 feet, and the timber of not a few is capable of a very high polish, and is now made use of for articles of ornamental furniture.

Mr. Kelly, in his description of the Forest of Taremki, writes as follows of the Puriri, or Ironwood, and of the Rata:—

IRONWOOD, OR PURIRI.

"This tree from its hardness and durability has been denominated the New Zealand oak. It splits freely and works easily, does not injure by exposure to damp, having been known to last 20 years as a fencing post without suffering much injury from decay. Its timber is used where great durability is required. It is used for cart work, bridges, teeth of wheels, and fencing posts. It grows from 20 to 40 feet without a branch, and in this province from 3 to 6 feet in diameter."

RATA.

There are several varieties of this tree. One grows first as a parasite, creeping in numerous stems like ropes up the trunks of the other forest trees, gradually enclosing them till they perish, and then uniting to form a noble tree, taller than those which it has destroyed, with an enormous trunk, but hollow within. It is invaluable to the shipbuilder for knees and timbers of all shapes and sizes. It is principally used by the wheel and mill wright, being well adapted for the purpose in consequence of its great strength.

There were numerous other specimens of timber deserving of mention, but it should be borne in mind that the object of this paper is not to deal with every group of exhibits in detail, but to give a general idea of the wealth, products, and prospects of the colony. The limited amount of space at my disposal will not enable me to do more than to call attention to the catalogue in the appendix as a guide to the several manufactures of New Zealand, or to make more than a passing reference to the charming photographs of New Zealand scenery and landscape.

SILK.

The silk exhibits demand a few words. This is a material for the production of which the climate of Taranaki is said to be peculiarly favourable, and if greater exertions were made to cultivate it there is no reason why it should not form a valuable article of export.

New Zealand.

Gum.

Kauri gum.

Amongst the miscellaneous articles were also included several specimens of Kauri gum as assorted for the London market.

It appears that this gum forms a valuable article of export which formerly the Maories used to monopolise, but which now has attracted the attention of numerous Europeans. There is therefore a larger increase in the quantity obtained, which finds a ready market in London. The method of searching for and procuring this gum is as follows:—

"A party goes with a long spear having an iron barb, and pushes it into the ground to a depth of about 2 feet in likely places. The gum is most frequently found in hillocky marshy plains where fires have ages ago most probably burned Kauri forests, and where the débris forms small hillocks. In some instances over a ton has been found at one tree, but the quantity generally averages from a few pounds to 5 cwt."*

5,054 tons of the value of 167,958*l.* of Kauri gum were exported in 1871, and, as before stated, the value of the amount exported for the year ending 30th June 1872 was 155,000*l.* Many natives are employed on the gum fields.

Miscellaneous exhibits.

Miscellaneous.

In addition to the articles of produce to which I have briefly referred, the New Zealand court was conspicuous for many interesting exhibits classed under "Fine Arts and miscellaneous." First and foremost were the skeletons of the Moä (*Dinornis*) and Palapteryx Elephantopus, the first of which, as might be expected, excited much attention from its enormous proportions. Then there was Dr. Buller's work on the birds of New Zealand, the illustrations in which were perfectly executed. It may be mentioned that the native Avi-fauna of the country comprises 145 species, that a large proportion of the genera are peculiar to it, and that some of the forms are perfectly anomalous, being entirely without a parallel in any other part of the world. There were clubs, mats, war implements, and Maori dresses exhibited by the Agent-general for the colony, together with some exquisite inlaid cabinet work.

Perhaps the most perfect cabinet was that shown by Dr. Buller, and made by Mr. Seuffert of Auckland; it is a most artistic piece of workmanship. The lid of this cabinet represents a view of Auckland Harbour, with ferns and the

* Stevens and Bartholomew's Directory.

native vegetation peculiar to the colony in the foreground. This piece of work is well calculated to display the extraordinary variety in shade and colour of the different timbers grown in New Zealand. NEW ZEALAND.

But the most striking and perhaps unique object in this court was the superb collection of rare and curious birds brought from the colony by Mr. James Brogden. This was admitted to be the finest display of natural history ever shown at any international exhibition.

CONCLUDING SUMMARY.

Although only about 33 years have elapsed since the beginning of colonization in New Zealand, she is already fourth in rank and importance on the list of British colonies. In her revenue, imports and exports, and other elements of material progress, New Zealand is only surpassed by Canada, Victoria, and New South Wales. Looking to the vast and varied natural resources of the country, and relying on the energy and industry of the population, there can be but little doubt that New Zealand will reach a still higher degree of prosperity than that to which she has already attained.

The colony is now so prosperous that employment for any number of working men can be found.

Large quantities of land are being opened up for settlement by the Government. The regulations in connexion with these special settlements have not reached me, but most probably the gist of them will be that grants of land at a low rate per acre will be given on a system of deferred payments. Roads and railways are surveyed through the districts, and thus a great deal of work, which will be paid for at an average rate of 5*s.* 6*d.* per day, can be had. This is true of most parts of New Zealand, so that none, to whatever province they go, need fear any want of well-paid work, for a large portion of the Government loan (amounting to 1,000,000*l.*) has been allocated for that purpose. Regulations as to settlement.

In "Notes on New Zealand for the use of Emigrants," it is observed that the best thing generally for immigrants to do, especially for such as have no money and no definite trade, is to engage in such work, or to take situations as ploughmen, shepherds, overseers. After working a very few years in this way, they can, with care, save enough to make a good start in farming. Even if men have a little money when they arrive, it is generally unwise to take up land at once. Their capital can be placed at eight or ten per cent. on mortgage for 12 months, or put in the bank at five per cent. During this time they can look about them and gather some colonial experience, meanwhile doing any Emigrants opening for.

NEW ZEALAND. Emigrants, opening for.

honest work that may come in their way. For there, as elsewhere, anything is better than idleness, through which money will be lost or slovenly habits contracted.

Large capitalists have more at their command, and can either permanently invest their money at 10 per cent., or get land and hire labour, and, *to some extent*, experience. But wisdom and caution are also necessary in their case in entering on investments in a new country.

Class most desired.

The class of immigrants who are most benefited by going to such a colony as New Zealand are the small farmers who do their own work with little or no hired labour. In this country many of them must have great difficulties to contend with, and it is hard to see how, considering the high rents they have to pay, from the competition for farms and the ever-increasing expenses of farming, they can squeeze out an existence from the oft unfertile soil, which few of them have the means of enriching by artificial manures and improved methods of husbandry. And if they have large families, how difficult it is to educate them and to launch them out into the world! With a little variation the same things are true of ploughmen, many of whom are, for the greater part of the year, entirely separated from their families, because on many farms no cottages are provided. At first, indeed, they would have a good deal to contend with in a new country, and labour is as necessary there as in England. The truth is, that any sober industrious man must succeed in New Zealand, but he *must* be sober and industrious. Of course he will do it much sooner if he can take 200*l.* or 300*l.* with him, and act prudently when he goes there, avoiding dishonest men and dishonest ways, and not rushing hastily into a thing before he well knows what he is about. If he be a family man, he will find his sons and daughters helpful to him. He can keep them more or less about him, which he can hardly do in this country. From the immense disproportion between the sexes, he is not likely to keep his girls long under his roof. Very soon they will marry and get homes of their own. Before this they can, if they choose, take situations at wages of from 8*s.* to 12*s.* a week, being found in everything except clothing. It is worthy of note that women are never employed in any out-door labour in New Zealand, as they not unfrequently are in many parts of Great Britain.

From these few notes it appears that in 1860 the revenue of New Zealand was 464,000*l.*, in 1872 it was 1,967,854*l.* Her total exports were of the value in the former year,

588,000*l.*, in the latter of 5,190,665*l.* The total quantity of gold exported in 1872 was of the value of 1,730,000*l.*, and of wool, 2,500,000*l.* All these exports are produced by a population of 266,000 souls, as against less than 99,000 in 1860. Such progress needs no further comment, but in conclusion I cannot do better than quote the following passage from the admirable work upon New Zealand by Dr. Hochstetter, to whom by the way, for assistance rendered in Vienna, I am much indebted. He says:—

"New Zealand bears the most resemblance to the mother country, by virtue of its insular position, its climate and soil, and the whole form and structure of the country. It lies towards the neighbouring Australian continent like Great Britain towards Europe. Blest with a genial oceanic climate, so admirably suited to the Anglo-Saxon race; with a fertile soil, well watered, and splendidly adapted to agriculture and farming, with a manifold coast-line, suiting perfectly to the notions and habits of the first maritime nation of the world; it is a country without dangerous animals, without poisonous plants, but rich in mineral treasures; a country where horses, cattle, and sheep thrive, where fruit, grain, and potatoes grow most abundantly; a country adorned with all the charms and beauties of grand natural scenery; a country which can easily support a population of twelve millions; which promises the bold and persevering emigrant a lucrative and brilliant future; such a country appears, indeed, destined before all others to become the mother of civilised nations."

The Commissioners for New Zealand at Vienna were—Isaac Earl Featherston, Esq., M.D., and Sir Charles Clifford.

QUEENSLAND.

Queensland at the very commencement of its political existence in 1859 took in point of revenue the twelfth place among the then 48 dependencies of the British crown, and it began an independent career with the fairest prospect of a steady advance to permanent wealth and prosperity.

As the following report will prove, that prospect is in course of full realization, for we now find that Queensland in her revenue and in her trade ranks about eighth amongst England's colonial possessions.

QUEENSLAND.

Area.

The colony, which was originally called Moreton Bay, is of very large extent, embracing an area of about 678,000 square miles, or about five times that of the United Kingdom. It has a latitudinal extension from 29° S. to 10° S., and a longitudinal one from 138° E. to 153° E.

In 1862 and 1872 the revenue, expenditure, imports, and exports, were as follows:—

Revenue, &c.

	Revenue.	Expenditure.	Imports.	Exports.
	£	£	£	£
1862 - -	295,286	317,026	1,323,509	793,236
1872 - -	996,323	852,051	2,218,717	2,998,934

Population.

The population on the 31st December 1872 was estimated at 133,553. At the date of separation from New South Wales it was 25,100. So that the increase for 11 years has been 108,453.

Brisbane, the capital, is situated 22 miles from the mouth of the River Brisbane, which flows into Moreton Bay. Already there are 200 miles of railway opened, and 2,600 miles of telegraphic communication.

Mineral wealth.

Queensland is rich in metals and minerals. The gold exported from the colony in 1872 was 186,019 ozs.

The gold fields are situated at intervals along the range dividing the waters flowing to the east coast from those trending westerly; from the southern boundary of the colony to latitude 15° S., or over 14° latitude.

During 1871 63,399 tons of quartz were crushed on the gold fields, yielding an average of 1 oz. 15 dwt. 23 grains per ton. The richest quartz came from Gympie and Gilbert. On all the established gold fields work is being steadily prosecuted.

Copper, lead, zinc, and antimony are found over the same space. A large number of copper mines have recently been opened up, but as the working has principally been confined to preliminary operations, copper does not figure as a large item amongst the exports, the quantity exported in 1872 having only been 3,929 tons.

Fresh discoveries are constantly made, and capital is being brought to bear on the discoveries.

Tin is abundant in the district of Stanthorpe, which occupies an area of about 30 miles square, the centre of which is in lat. 28° 45′; long. 149° 50′. 1,333 tons, valued at 108,310*l.* were exported in 1872. Tin has also been found at the head of the Burdekin, lat. 18° 30′, long. 151° 10′;

in the Star River, and other districts of Northern Queensland. Mining skill and additional capital are required to open up the tin mines and develop the mineral resources of the colony.

Mercury ores have been found in large deposits at the head of the Mary River, lat. 26° 30′, long. 152° 30′; and on the Clarke River, a tributary of the Burdekin.

Coal, associated with iron, is abundant from the south boundary to latitude 20°, or over 9° of latitude, but very little has as yet been mined. Coal.

A fresh coal mine has just been discovered on a property adjoining the Tivoli mine, a quarter of a mile from the river. The seam is 2 feet thick, and the coal said to be the best yet opened out in the neighbourhood of Ipswich.*

The analysis of the various Queensland coals exhibited at Vienna are given in the following table, and may be useful for comparison with other Australian coals:—

Analysis of Queensland Coals exhibited at Vienna.

Name of Mine.	Carbon.	Hydrogen.	Oxygen and Nitrogen.	Sulphur.	Ash.	Water.	Remarks.
Aberdare -	71·140	5·113	11·490	0·260	9·720	2·277	5 feet thick; 5 miles from Ipswich.
Tivoli - -	79·010	5·190	6·560	0·370	7·730	1·140	3 feet thick; 2 miles from Ipswich.
Allora - -	69·310	6·080	11·510	0·310	8·870	3·920	2 feet thick; 2½ miles from railway.
Rosewood -	68·280	6·340	9·080	0·400	13·980	1·920	1 foot thick; 2 miles from railway, 31 miles from Brisbane.
Flagstone Creek	59·410	4·700	9·380	0·500	22·120	3·890	1½ feet thick; 8 miles from railway at Helidon.

Their composition, exclusive of sulphur, water, and ash, is as follows:—

Name of Mine.	Carbon.	Hydrogen.	Oxygen and Nitrogen.
Aberdare - -	81·077	5·828	13·095
Tivoli - - -	87·050	5·720	7·230
Allora - - -	79·75	7·000	13·250
Rosewood - -	81·58	7·570	10·850
Flagstone Creek -	80·84	6·400	12·760

* See further information, page 218.

QUEENSLAND.

The analysis of British coals calculated in the same manner are here inserted for comparison with the above.

—	Carbon.	Hydrogen.	Oxygen and Nitrogen.	Remarks.
Seaton Barn steam coal	80·54	4·76	14·70	From same veins as Hartley coal.
"Low main seam" -	81·01	6·17	12·82	Buddle's Hartley colliery.
"Three-quarter vein" -	86·25	5·90	7·85	Blaina, South Wales.
"Big vein" - -	87·14	6·49	6·37	Blaina - „
Binding or caking coal	86·28	4·36	9·36	Used for copper smelting in South Wales.

The ash in the English coals quoted in this list is much less than that in the Queensland coals, with the exception of the last mentioned as used for copper smelting in South Wales, which contains 13·37 per cent.

The comparison shows, however, that as far as their bituminous qualities are concerned, the Queensland coals are fit for steam purposes, those containing the least quantity of ash being the most valuable.

The Rosewood coal yields 48 per cent. of volatile gases, and is an excellent *gas* coal; it will be seen that it is nearly identical in composition with the "Low main seam," Buddle's Hartley Colliery.

Precious stones.

Diamonds have been found in the colony.

Sapphires are frequent in the sands of the watercourses in the Stanthorpe district, and near Rockhampton.

Opals have also been recently discovered in considerable numbers on the Barcoo and Bulloo rivers in the south-west of the colony and near Springhure.

General produce.

The productive qualities of the soil of Queensland are fully equal to those of any of the other Australian colonies. Possessing almost every description of soil and climate, it is capable of producing agricultural products peculiar to temperate, semi-tropical, and tropical climates.

The sugar cane, banana, pineapple, cinnamon, guava, nutmeg, and other tropical plants grow luxuriantly in close proximity to cereals, vegetables, and fruits, usually cultivated in Great Britain.

Agricultural Products.

Agricultural produce.

The Commissioners for the Vienna Exhibition, whose report I have, with the kind permission of Mr. Daintree, freely adopted, state that it is a common but mistaken impression that the colony can support nothing but tropical or sub-tropical vegetation, and thus it is popularly called "Banana Land" by the diggers of Victoria and New Zealand, who visit the gold fields. But, as a matter of fact, there is a large area of Queensland forming the elevated table land or downs, on and near the summit of the great dividing range, where the banana, sugar cane, or cotton plant will not flourish, and where the pineapple, which is grown as a field crop in the low-lying districts, is known only as an imported luxury. The tract of country referred to is proved to be well suited for the growth of wheat, potatoes, and other crops most familiar to the British farmer, and cannot be surpassed elsewhere in the character of its fruits, with the exception of a few descriptions that appear to flourish nowhere out of the United Kingdom and Northern Europe. In the Darling Downs proper, and the extension northwards of that upland tract, there is sufficient land to grow wheat enough to feed the population, however much it may increase. There are at present so many openings for the profitable employment of capital and enterprise, that the principal owners of land on the Darling Downs do not care to incur the trouble and risk of farming, and the greater portion of the ground is used for the feeding of stock from the natural pasture. The continuance of this state of things is of course only a question of time. Pastoral settlement seems to have been, in most countries, the original form of society. A more profitable employment of the soil, where practicable, must follow in its turn; although a large extent of the interior will probably never be employed for anything but for feeding stock, and the pastoral interest will always be a most important one. Along the eastern coast lands of Queensland agriculture is steadily making its way, and the progress of sugar growing especially has been something that has never before been equalled in the history of industrial advancement. Cotton cultivation has certainly been influenced by the withdrawal of the bonus granted for a term of years by Parliament, and also from the fact of labour having become scarce and costly, owing to the attractions offered by recent mineral discoveries. This industry, however, cannot fail to advance with the increase of population, as the labour of children can be made available during the picking season.

Sugar and cotton cultivation.

QUEENSLAND.

Farther reference to the different crops grown in Queensland will be found in the catalogue printed in the appendix.

Cereals.

CEREALS.

The specimens of wheat from Darling Downs and East Moreton were stated by the Commissioners not to be at all equal to some that have been exhibited at local agricultural shows. From causes that have been stated above, the cultivation of this cereal has practically been confined to one district of the colony, and even there it has not taken the place which it will yet assume. It may not be necessary, according to the dicta of political economists, that every country should produce its own breadstuffs, but it is gratifying to know that, should need arise, the soil of Queensland is able to provide the people with "the staff of life." There are flour mills at Brisbane, Warwick, Allora, and Toowoomba; but the work of grinding wheat or other grain is not sufficient to employ more than a portion of their time. The Queensland flour is better than any that could be imported, for flour always suffers from a sea voyage. The flour exhibited at Vienna by Mr. J. Keates was in fine condition, and of good quality.

The number of acres under wheat crop in 1871 was 3,061, which yielded an average of 19¼ bushels to the acre.

There is a good deal of barley grown on the Darling Downs, principally owing to the demand for the grain, for the purpose of malting, that has arisen since the establishment of a brewery at Toowoomba, where the water appears to be particularly adapted for the manufacture of malt liquor. Some very good samples have been produced, and the climate and soil appear to be suitable for the growth of this cereal; but the majority of the cultivators require greater experience before they can be completely successful.

Only one sample of maize was shown at Vienna. It is grown to perfection in every part of the colony where the soil is cultivated, and the farmers probably thought that so common a production was not worth being exhibited.

20,681 acres were under crop in 1871.

Arrowroot, &c.

ARROWROOT, &c.

Queensland appears to be peculiarly suited for the cultivation of arrowroot, which is gradually supplanting the imported West Indian or Bermuda article in the Australian market. A very small price, perhaps as low as threepence per pound, would remunerate the grower who manufactures

on a large scale, and we may confidently look forward to this valuable alimentary substance occupying an important position amongst the exports from the colony. In 1861 the manufacture of arrowroot hardly existed. The quantity exported in 1871 was 40,560 pounds, which represented the surplus after supplying the local demand. Tapioca and cassava are also easily produced, but very little has been done as yet to develope the nascent industry, except on a small scale. The samples exhibited were of fair quality, and the quality will improve when greater experience in the manufacture has been gained.

SUGAR.

Sugar.

At the International Exhibition in 1862 some sugar canes from Cleveland and the Botanic Gardens were exhibited, and in the catalogue of the Queensland products the remark was made: "There can be but little doubt that sugar growing will form one of the industrial occupations of the country in a few years." This prediction has been more than fulfilled in a shorter period than could well have been anticipated. Sugar growing is already included among the more prominent industries of Queensland, and considerable quantities have been shipped to the neighbouring colonies, where the sugar has commanded a good price. The rich scrub and forest lands on the banks of the rivers all along the coast from the southern boundary to lat. 18° are admirably suited for the cultivation of the cane. A refinery has been established and two improved sugar mills are being erected. Besides providing for its own consumption, Queensland will soon be able to supply Australasia with an article of a superior description. The chief supply of sugar for Australian consumption is at present drawn from Mauritius.

With reference to the exhibits, it may be explained that they were supplied on application being made to the oldest growers in the different sugar-producing districts.

In 1865 there were only 450 acres of sugar canes in crop, against 9,581 in 1871. The quantity of sugar manufactured in 1872 was 6,266 tons, instead of 4,750 tons as estimated, and the quantity of rum made was 118,291 gallons.

Along with the samples were shown at Vienna specimens of the soil of the cane fields in each locality, the latitude and longitude of the latter being stated in order that an idea might be formed of the extent of the territory in which the cane is successfully cultivated. Sugar being now a leading agricultural product which has started into existence within

QUEENSLAND.

the last few years, and a large and increasing area of country being taken up for its growth, the industry will certainly soon assume very large proportions. The planters have for the most part entered without experience on their work, and much has no doubt yet to be learned as to the best mode of cultivation and manufacture adapted to the conditions of the soil and climate. It is reported that in Cardwell, where the industry has but recently been introduced, 38 tons of sugar were obtained from 15 acres of land. The growth of the cane is one of the best paying agricultural pursuits of the colony.

Exhibits of sugar.

Fifteen samples of sugar from Queensland were exhibited at Vienna and attracted much attention, and the jurors made the following awards in respect to 10 of them:—

A. H. Brown, medal for progress.

John Eaton, Ramsey Brothers, Johnston and Sons, and the Government Penal Establishment, medals for merit. Whilst to Messrs. Jordan, Muir, Nind, Mackenzie Brothers, and the Port Royal Mill, were awarded the diploma of honourable mention.

The following table furnished to me by Mr. Daintree gives the analysis and value per ton of these exhibits, and in some cases the yield per acre; the facts contained therein speak for themselves.

Queensland Sugars.

Name of Exhibitor.	Variety of Cane.	Latitude.	Longitude.	Crystallizable Sugar.	Uncrystallizable Sugar.	Water.	Ash.	Unknown Organic Matter.	Yield per Acre.	Value per Ton.
		° ′	° ′						Tons.	£ s. d.
Messrs. Mackenzie Brothers -	Bourbon	18 37	146 11	94·00	3·10	1·86	0·54	0·50	2½	29 0 0
J. E. Davidson, Esq. 1 - -	„	21 11	149 10	90·60	4·10	3·20	0·32	1·78	2	—
„ „ 2 - -	„	21 11	149 10	93·40	2·60	2·74	0·63	0·63	—	24 10 0
„ „ 3 - -	„	21 11	149 10	93·40	2·60	2·44	0·49	1·07	—	24 10 0
John Eaton, Esq. - -	—	25 38	152 40	96·10	2·22	0·87	0·54	0·27	—	30 0 0
Messrs. Ramsay Brothers -	Bourbon	25 30	152 41	91·80	6·00	1·65	0·18	0·37	4	30 0 0
A. H. Brown, Esq. - -	—	25 50	152 38	99·00	0·40	0·12	0·22	0·26	—	32 10 0
Messrs. Raff and Co. - -	Black Cheribon.	27 9	150 0	97·70	0·80	0·40	0·21	0·39	—	31 0 0
J. Johnson and Sons - -	—	27 30	153 8	84·00	11·11	3·74	0·27	0·88	1½	23 10 0
Hon. Louis Hope - -	—	27 30	153 16	94·00	3·10	1·86	0·54	0·50	2	28 10 0
Henry Jordan, Esq. - -	Violet	27 45	153 7	93·40	3·33	1·42	0·63	1·22	—	30 0 0
Government Penal Establishment	Ribbon	27 24	153 15	82·30	10·64	3·58	0·58	2·90	2	23 10 0
P. H. Nind, Esq. - -	—	27 48	153 23	89·20	6·00	2·75	0·96	1·09	—	25 0 0
Robert Muir, Esq. - -	Ribbon	28 2	153 25	95·00	3·33	1·13	0·36	0·18	—	30 10 0
Port Royal Mill - - -	Bourbon	27 19	152 2	92·80	4·76	1·68	0·31	0·45	—	30 0 0

QUEENSLAND.

Sugar exhibits.

It will be seen from this list that sugar has now been successfully grown in Queensland on plantations separated by nearly 10 degrees of latitude.

The exhibit of Messrs. Ramsay Brothers of the Jindah plantation near Maryborough was from a sample of 40 tons, the yield of 10 acres of cane.

This sugar was valued by Messrs. Wm. Anderson & Co. of Mincing Lane at 30*l.* per ton, which would give a gross yield of 120*l.* per acre.

Mr. J. E. Davidson's three exhibits were from samples of 240, 120, and 35 tons respectively, the produce of 200 acres of land.

The average value of these 395 tons at 24*l.* per ton gives 9,480*l.* as the gross yield of 200 acres, equal in round numbers to 50*l.* per acre.

The annexed analysis of some of the soils upon which the sugars exhibited were grown, may be considered typical of large areas in Queensland on the banks of the east coast rivers, and will show how admirably adapted they are for such a crop as cane, which requires a large supply of nitrogen, alkalies, and phosphoric acid for its vigorous growth.

NOTE.—Since the exhibition at Vienna closed, and since this report was written, information has reached me to the effect that extensive tracts of land suitable for sugar growing, and valuable coal seams, have been discovered by exploring expeditions sent out by Government on the coast 50 miles north of Rockingham Bay, whilst extensive gold discoveries on the Palmer River have led to the formation of a new port on the coast at the entrance of the Endeavour River. The discovery of coal on the seaboard so far north is likely to be a very important one to the colony, as it is the nearest port of shipment for coal to India and China yet discovered in Australia.

QUEENSLAND SOILS (Analysis furnished by Agent-General).

	Davidson's Alexandra Plantation, Mackay.	Top Soil.		Alexandra Subsoil.		Alexandra, 30 inches deep.	
In natural state	When received these soils contained water (lost at 212° F.)	3·120		3·140		2·700	
In air-direct state	The following results are calculated for the soil in air-direct state :—						
Mechanical analysis	Water (lost at 212° F.)	2·950		2·734		2·354	
	Organic matter	5·075		3·384		1·831	
	Clay, including oxides of iron and alumina	70·036		69·091		72·282	
	Fine sand (quartz)	21·939		24·791		23·533	
		100·000		100·000		100·000	
	Containing nitrogen	·306		·082		·022	
	Equal to ammonia	·371		·099		·026	
	Specific gravity at 60° F.	2·177		2·280		2·308	
	Water (lost at 212° F.)	2·950		2·734		2·354	
The soluble salts consist chiefly of sulphates. The solubility of iron and alumina increases with the organic matter soluble in water.	Soluble in water :—						
	„ organic matter	·250		·100		·080	
	„ oxides of iron and alumina	·095		·014		·020	
	„ lime	·084		·067		·078	
	„ magnesia	·038	·690	·030	·380	·034	·390
	„ chlorine	·0022		·0019		·0012	
	„ alkalies and sulphuric acids	·1558		·1521		·1518	
	„ silica (finely divided)	·085		·015		·025	
	Soluble in acid :—						
	„ water of constitution	3·464		3·984		3·422	
	„ organic matter	4·825		3·284		1·751	
	„ oxides of iron (chiefly peroxides)	3·843		4·955		4·612	
	„ alumina	8·124		9·320		10·030	
	„ lime	·380		·326		·253	
	„ magnesia	·372		·286		·492	
	„ potash	·311		·285		·263	
	„ soda	·046		·002		·088	
	„ sulphuric acid	·254		·237		·226	
	„ carbonic acid	·180		·080		·100	
	„ phosphoric acid	·144		·082		·081	
	„ silica (set free by alkali)	8·705		7·781		8·550	
	Insoluble silicious matters	65·712		66·314		67·388	
		100·000		100·000		100·000	

QUEENSLAND SOILS—*continued.*

		I. Best Scrub Soil, Yellow Wood Plantation, Albert River	II. Best Forest Soil, Yellow Wood Plantation, Albert River.	III. Forest Soil, Yellow Wood Plantation, Albert River.
In air-dried condition	These soils when received contained water (lost at 212° F.)	7·601	8·502	4·404
	The following results are calculated for the soil in the air-dried state:—			
Mechanical analysis	Water (lost 212° F.)	5·994	6·705	3·676
	Organic matter	10·623	11·834	7·907
	Clay, including oxides of iron and alumina	81·723	78·456	75·050
	Fine sand (quartz)	1·660	3·005	13·367
		100·000	100·000	100·000
	Containing nitrogen	·457	·343	·214
	Equal to ammonia	·554	·416	·259
	Specific gravity at 60° F.	1·999	1·915	2·371
The soluble salts consist of sulphates and organic acid compounds.	Water (lost at 212° F.)	5·994	6·705	3·676
	Soluble in water:—			
	„ organic matter	·152	·193	·110
	„ oxide of iron and alumina	·031	·086	·053
	„ lime	·057	·035	·033
	„ magnesia	·029 ·447	·021 ·499	·019 ·310
	„ chlorine	·007	·005	·012
	„ alkalies and sulphuric acid	·050	·022	·016
	„ silica (finely divided)	·101	·137	·065
	Soluble in acid:—			
	„ water of constitution	3·610	4·493	2·204
	„ organic matter	10·471	11·641	7·797
	„ oxide of iron (chiefly as peroxide)	6·937	8·369	6·009
	„ alumina	7·021	11·270	6·991
	„ lime	1·259	·522	·566
	„ magnesia	1·043	·302	·158
	„ potash	·453	·269	·130
	„ soda	·119	·317	·401
	„ sulphuric acid	·206	·175	·161
	„ carbonic acid	·241	·101	·102
	„ phosphoric acid	·301	·221	·193
	„ silica set free by alkali	8·912	4·377	3·210
	Insoluble silicious matters	52·986	50·739	68·092
		100·000	100·000	100·000

TEA AND COFFEE.

Tea and coffee.

There can be no doubt that both tea and coffee can be cultivated with complete success in Queensland; but what has been said above as to the range of climate and soil also applies here.

TOBACCO.

Tobacco.

The exhibits of tobacco were not so varied in class as they might have been, but were sufficient to prove that a good quality of leaf can be grown in Queensland. Through want of experience in the cultivation of this crop, the farmers do not grow it so much as they would do were they better aware of its profitable nature. Manufacturers state that the Queensland tobacco is inferior to none, but they cannot sell it as a colonial product. The consequence is that it goes into the market in the shape of Havannah cigars, or cut tobacco of American brands, and meets with a ready sale.

This very undesirable state of things will doubtless not continue. A medal of merit was awarded for the collection of tobacco and fibres.

WINE.

Wine.

Only two samples of wine, the produce of last year, were forwarded.

There is a large quantity of wine made in the colony, some of which is very good after having the advantage of a year or two in bottle.

It is nearly all consumed in the neighbourhood where it is produced, and vine growers mostly look for profit from the sale of the fruit. From the great range of soil and climate it may confidently be anticipated that some of the districts will yet acquire a reputation beyond the colony for their vintages.

It was stated in a recent Australian and New Zealand Gazette that 380,000*l.* was spent last year in Queensland in the purchase of alcoholic drinks. I have not been able to check this statement, but if true it is greatly to be desired that the production of a pure and wholesome beverage which would in part displace spirits may be largely increased.

FIBRES.

Fibres.

The increasing demand for fibrous material, in different branches of the industrial arts, has caused a share of atten-

QUEENSLAND.

Fibres.

tion to be devoted to them for some years past in the Botanic Garden. Queensland is rich in indigenous fibre-yielding plants, and as time and means permit valuable discoveries may be made under this head. The work is one pertaining to the objects of the experimental branch of the garden, and is not likely to be taken up by the farmer, who has an ample field for his enterprise in the cultivation of crops known to be remunerative. The Queensland hemp (*Sida retusa*) is perhaps of greater economic value than the other exhibits enumerated, being an indigenous plant growing as a weed along the coast districts, and making its way gradually into the interior; and if cultivated it would form a close and heavy crop, yielding probably as much as a ton of fibre to the acre. With the present appliances the cost of producing this quantity in a manufactured state within the colony is from 30*l.* to 40*l.*

These fibres attracted a considerable amount of attention at Vienna.

Dugong oil.

DUGONG OIL.

This oil, which is derived from the Halicore Dugong, is used for the same purposes in medicine as cod liver oil, to which it is quite equal as a therapeutic agent, without having the same disagreeable odour. Several years ago it was introduced in Great Britain and the continent of Europe; the extent of the demand, and the consequent high price secured, induced unscrupulous persons to adulterate the article with common fish oil, owing to which Dugong oil for a time went out of favour. This unfortunate circumstance might be remedied were the English importers to purchase only from persons who are above suspicion, and who are in a position to guarantee that the article is genuine.

Miscellaneous.

MISCELLANEOUS.

In the different regions of Queensland every description of condiment can be produced. The northern coast districts are more favourable to some of the species, but in the southern portion ginger and chilies, from which cayenne pepper is made, grow very freely. Under this heading it may again be said that the development of these and of many others of the resources of the colony depends entirely upon the settlement of a population on the soil.

A practical chemist, Mr. Carmichael, who has devoted much time and ability to experiments on the vegetable

products of Queensland, exhibited some bitters, tinctures, and pomades of novel description, the commercial value of which is at present unknown. A multitude of articles useful in medicine, in the manufacture of perfumes, and in various applications of the arts, could be prepared from these sources. QUEENSLAND.

COTTON. Cotton.

Only two exhibits of cotton were forwarded, and both are of the short-stapled description. A large area of land in the Moreton districts is still taken up in its cultivation, although it is not now so much in favour with the farmers as when a good bonus was paid by the state. When grown in connexion with other crops which require an abundant supply of labour at different intervals, such as sugar cane, tobacco, &c., cotton will still take a much higher position in our productive resources than it has yet done. It can be grown not only in the neighbourhoods of Brisbane, Gladstone, and Rockhampton, but on the elevated table lands of the colony 200 miles from the sea board. A supply of cotton equal to any demand could be grown in Queensland if sufficient labour and capital were introduced. The quantity exported in 1871 was 2,603,000 lbs., valued at 79,317*l.* 12,962 acres are now under cotton cultivation, against 395 in 1861.

SILK. Silk.

Silk culture has not made much progress, having not yet completely emerged from the stage of experiment. Three samples only were sent, but there appears lately to have been an increased disposition evinced to embark in this industry. There is everything in its favour in Queensland. The mulberry grows luxuriantly, the worms are free from disease, and the climate allows a succession of crops to be obtained during the year. Honourable mention was awarded to these exhibits at Vienna.

TIMBERS. Timbers.

Owing to the vast area of Queensland, and the diversity of the soil, climate, and altitude of the land, there is a greater variety of indigenous trees than in the rest of the Australian colonies, and perhaps more than could be found within a similar extent of country in any other part of the world. The specimens of woods exhibited at Vienna, and to which

QUEENSLAND. Timbers.

were awarded a medal of merit, form a collection of a few that were easily procured, and were chiefly chosen for their economic value. The list, however, does not include one fourth of the species that have already been described, and there are most certainly very many which have not yet been classified. Each district of this immense territory is characterised by features in its vegetation peculiar to itself, and years must elapse before all are known and botanically arranged.

It will be for the practical builder, the shipwright, and the cabinet-maker, to pronounce an opinion upon the utility of these woods; and it is probable that several of them will have a greater value put upon them in the mother country than they receive in the colony.

The value of some descriptions of the Australian Eucalypti for building or railway purposes has for some time past been fully recognised; and the number of species is greater in Queensland than in other parts of the continent. The case is the same with other woods, the variety of which is very great, that are remarkable for their strength, durability, fineness of grain, or ornamental appearance.

It is impossible to state the price at which the Queensland timbers can be placed in the market. For some there is no local demand. The cost when placed on board ship will not, however, be great, as most of our valuable woods grow on the coast or the banks of the rivers, or are found within reach of the facilities for transport provided by railway communication.

I regret that space does not admit of including in this report the interesting description of the specimens of Queensland timber given by Mr. Walter Hill, but these exhibits at Vienna and South Kensington are a proof of the immense wealth possessed by the colony in her varied timbers, which are fitted for both manufacturing and building purposes.

The Moreton Bay pine is said by Mr. Hill to be without exception the most ornamental and useful tree in Queensland. Its beautiful regular pyramidal form, and the sombre green of its awl-shaped foliage, command general admiration. It covers immense tracts of land along the coast and in the interior. It overtops all other trees, whether growing on the alluvial banks near rivers, or upon the steep and rugged mountains in the interior. Its branches are produced in whorls from six to eight, horizontally and spreading. The bark is thick and brownish. The timber is an article of great commercial importance, and is used

extensively in the colony. The wood is strong and durable when kept dry, but soon decays when exposed to alternate damp and dry. When procured from the mountains in the interior it is fine grained, and is susceptible of a high polish, which excels that of satinwood or bird's eye maple. The resin which exudes is very remarkable, it has all the transparency and whiteness of crystal, and that portion of it which adheres to the trees hangs from them in the shape of icicles, which are sometimes 3 feet long, and 6 to 12 inches broad. The sawyers receive at the present time 65*s.* to 70*s.* per 1,000 feet, some trees yielding as much as 10,000 of saleable timber.

Perhaps the next tree in importance is the Bunya-Bunya. In the 27th parallel it grows thickly over a portion of country in extent about 30 miles long, and by 12 broad. The tree has a very singular appearance, the trunk is quite straight; its bark is thick and smooth, the branches are produced in whorls of six, seven, or eight; they are horizontal inflexed, and ascending at the extremities. From the style of growth, singular foliage, and peculiar fresh colour, when surrounded with other trees of a different habit and greyish tint, it produces a fine effect from the striking contrast presented by its rigid growth and fresh green lance-shaped leaves. The wood is not only very strong and good, but it is full of beautiful veins, and capable of being polished and worked with the greatest facility. The cones produced on the extreme upper branches with their apex downwards are large, measuring 9 to 12 inches in length, and 10 inches in diameter; on coming to maturity they readily shed their seeds, which are 2 to 2½ inches long by 1 inch broad, sweet before being perfectly ripe, after that they resemble roasted chestnuts in taste. In accordance with regulations issued by the Government, the tree is not allowed to be cut down by those who are licensed to fell timber on the crown lands, the fruit being used as food by the aboriginals. The trees produce some cones every year, but the principal harvest happens only every three years, when the blacks assemble from all quarters to feast on it. The foods seems to have a fattening effect upon them, and they eat large quantities of it after roasting it at a fire. Contrary to their usual habits, they sometimes store up the Bunya nuts, hiding them in a water hole for a month or two. Here they germinate and become offensive in taste to a white man's palate, but are considered by the blacks to have then acquired an improved flavour. The taste of the Bunya when fresh has been described as something between a chestnut and a raw potato.

QUEENSLAND.

Gums.

GUMS.

As is well known a great proportion of the trees of Queensland, as well as the Australian colonies, are "gum trees." To give a bare list of the Eucalyptus, acacias, and other plants yielding gums useful in medicine or the arts, would occupy a considerable space. However, they are not likely to form staples of commerce until the population has considerably increased, and labour consequently become less costly.

Wool.

WOOL.

The staple product of the colony was but meagrely represented at Vienna. The Commissioners state that the three samples sent fairly represent the characteristics of the combing and clothing wools of the colony, and to them was awarded a medal of merit.

Sheep	-	1861	- 3,500,000
„	-	1871	- 7,413,334
Wool exported,		1861	- 6,994,033 lbs.
„		1871	- 22,339,348 lbs.

There are eight meat preserving establishments in Queensland. The Central Australian Company secured a medal for merit.

Photographs.

PHOTOGRAPHS.

A notice of Queensland at Vienna would not be complete without a reference to the principal feature in the Australian court, viz., the charming collection of photographs taken by Mr. R. Daintree, which were a perfect series of illustrations of the settlement of the colony and the condition of life there. These photographs were so minute in detail that the soils and rock strata were carefully coloured after specimens arranged for comparison in little cases below. Below these again were samples of the produce of the soil.

As was well observed in the European Mail of the 2nd June 1873:—

"With these and the excellent maps, the intending emigrant is taught much that it would never occur to him to inquire about. He may inspect his future home with all its surroundings, and give the life that awaits him in Australia a fair trial in advance. He will learn to understand the character of the country, what suits cattle and horses, and what he must go in search of if he means to breed sheep. He will visit the straggling stations of the wealthy squatters, with their verandahs looking out upon

paddocks full of horses and milch cows, and their groups of aboriginal hangers-on in the foreground. He will see the solitary stockman's hut, the trains of laden drays dragging through the solitary bush, or drawn up for the mid-day halt. If he thinks of taking up his quarters in one of the smaller towns he will see them photographed, and will not find them particularly inviting. Or, if it is his idea to try his luck at the goldfields, he may compare the system of quartz mining with the others, and study his future 'chums' in the rough flesh, and learn all about the labour he must make up his mind to go through with."

Mr. Daintree receives the diploma of Honourable Mention in group 26 for "Education, teaching, and instruction."

The Commissioners for the colony at Vienna were *Messrs. Richard Daintree* and *Arthur Hodgson*.

Full information respecting the colony can be obtained of the Agent General, Mr. Daintree, 32, Charing Cross.

In conclusion, and in proof of the assertion at the commencement of this paper that Queensland is realizing the prospects with which she commenced her political existence, I annex a short statistical view of her progress since 1860, which needs no comment.

STATISTICAL VIEW of QUEENSLAND since Separation from New South Wales.

PRODUCTION.

Production.

YEAR.	Crown Lands, Area leased.	Total No. of Acres under Cultivation.	LIVE STOCK.		
			Horses.	Horned Cattle.	Sheep.
1860	Acres. 41,027,200	No. 3,353	No. 23,504	No. 432,890	No. 3,166,802
1861	51,811,200	4,440	28,988	560,196	4,093,381
1862	57,200,000	6,067	36,532	637,296	4,553,353
1863	74,286,080	11,262	45,805	880,392	6,672,400
1864	84,729,760	12,006	40,678	882,073	5,665,334
1865	98,634,880	14,414	51,091	848,346	6,594,966
1866	106,123,520	24,433	52,811	919,414	7,278,778
1867	171,093,920	31,559	53,143	940,354	8,665,757
1868	179,696,950	39,321	66,878	968,279	8,921,784
1869	171,903,692	47,034	71,530	994,600	8,646,243
1870	106,492,334	52,210	83,358	1,076,630	8,163,818
1871	107,284,934	59,969	91,910	1,168,235	7,403,334
1872	123,737,093	62,491	92,798	1,200,992	6,687,907

INTERCHANGE.

YEAR.	EXPORTS (SEAWARD), THE PRODUCE OF QUEENSLAND.												Imports.	Exports.	Rail-ways.	Electric Telegraph.
	WOOL.		TALLOW.		GOLD.		COPPER.		COTTON.		Timber (value).	Coal (value).	Total Value.	Total Value.	Miles Open.	Miles of Wire.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.						
	Lbs.	£	Tons.	£	Ozs.		Cwt.	£	Lbs.	£	£	£	£	£		
1860	5,007,167	444,188	640	25,628	4,127	14,576	—	50	—	—	2,442	646	742,023	523,477	—	—
1861	6,994,033	613,074	1,247	48,00a	1,077	3,928	360	644	—	4	2,629	1,870	967,951	709,599	—	169
1862	8,063,612	627,182	1,503	50,979	189	625	5,360	10,332	14,344	1,423	3,066	3,642	1,323,509	793,236	—	169
1863	10,669,044	776,776	883	30,716	3,936	14,802	173	296	31,557	3,056	4,482	4,279	1,713,263	888,381	—	221
1864	14,006,789	1,037,663	1,137	32,999	22,037	83,292	29	146	38,730	4,186	8,039	141	2,267,954	1,247,054	—	298
1865	12,251,841	885,299	1,940	57,155	25,338	92,938	4,424	18,440	145,820	12,197	8,383	3	2,505,559	1,153,464	21	1,131
1866	14,346,239	987,659	1,300	53,597	32,916	85,561	8,820	33,918	207,272	19,618	13,625	32	2,467,907	1,366,491	50	1,565
1867	21,554,557	1,462,209	2,733	90,293	42,091	189,248	17,920	66,038	412,941	26,631	17,802	—	1,747,735	2,198,609	136	1,752
1868	18,906,778	1,057,211	3,706	122,544	165,801	593,516	21,769	77,136	1,809,628	68,929	16,578	25	1,899,119	2,107,437	160	1,811
1869	22,386,650	1,098,149	5,240	166,039	138,221	523,045	24,535	87,268	1,118,899	51,217	30,241	202	1,804,578	2,166,806	206	2,182
1870	20,695,627	1,026,061	4,818	167,230	136,773	489,539	18,505	63,298	1,630,755	73,437	19,937	—	1,577,339	2,533,732	206	2,221
1871	22,339,348	1,158,333	6,209	139,181	171,937	616,907	51,099	174,701	2,602,100	79,317	20,216	—	1,562,665	2,760,045	218	2,614
1872	17,793,392	2,614,077	2,890	100,201	186,619	660,396	78,580	257,723	1,486,987	59,774	20,079	3	2,218,717	2,998,934	230	3,368

FINANCE.

Year.	Revenue.	Expenditure.
	£	£
1860 - -	178,589	161,503
1861 - -	238,238	255,180
1862 - -	295,286	317,026
1863 - -	295,215	355,791
1864 - -	369,425	439,034
1865 - -	472,451	459,025
1866 - -	490,269	594,130
1867 - -	610,860	661,795
1868 - -	724,854	742.207
1869 - -	738,218	761,594
1870 - -	743,058	764,491
1871 - -	823,169	787,555
1872 - -	996,323	852,051

SOUTH AUSTRALIA.

The colony of South Australia attained the 37th year of its existence on the 28th December 1873, for on that day in the year 1836 Governor Hindmarsh landed at Glenelg and read out his commission as first Governor, the assembled crowd standing under a gum tree to which there is at the present moment a plate affixed in commemoration of that event.

Geographical position.

The boundaries of the colony, according to the statutes of 4 & 5 Wm. 4, cap. 95, were fixed between 132° and 141° long. for the eastern and western boundaries, the 26° of S. lat. for the northern limits, and it is bounded on the south by the Southern Ocean. The coast line of South Australia extends some 1,600 miles, and the total area of the colony as originally settled was some 380,000 square miles, or 245,000,000 acres, a very good allowance per head when it is remembered that the population in that year was certainly not more, if as much as 10,000.

Area.

Since then the colony has received two large accessions of territory; the first, a strip of land lying between its western boundary and the eastern boundary of West Australia; the second, an immense tract of country stretching to the Indian Ocean, and known as the northern territory.

Mr. Stuart's expedition of 1862 determined the practicability of crossing from Adelaide to the Indian Ocean, and the result was such a very strong desire upon the part of the

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enterprising colonists to found settlements in the north and to increase the pastoral stations which had already been formed there, that the Imperial Government acceded to their wish, and by Royal Letters Patent, dated the 6th July 1863, extended the boundaries of the colony in such a manner as to embrace all the territory lying northward of 26 degrees, S. latitude, and between the 129th and 138th degrees of E. longitude.

The colony of South Australia stretches, therefore, right across the continent from ocean to ocean, and comprises an area of 914,730 square miles, or 585,427,200 acres.

This immense addition to South Australia made her, with the exception of Western Australia, the largest of all the British colonies, and nearly 100,000 square miles larger than Queensland.

Physical features.

A country of such enormous extent has, of course, much diversity in its physical features. Magnificent stretches of agricultural land, mountains reaching for hundreds of miles, valleys, creeks, fine timber, and arid plains impossible of cultivation. Even these latter have their recommendations, for it is here that the great mineral wealth of the colony is found, viz., copper and gold, which only wait the influx of additional labour and capital for their development.

The early settlers soon found the productiveness of the land to be very great. Valuable copper mines were discovered, which not only proved a source of wealth, but of profitable employment to a large number of colonists. At the period of the gold discoveries in the adjoining colony of Victoria, the Government of South Australia, by judiciously opening out roads and paths, and establishing posts, and affording the protection of escorts, not only checked the permanent migration of a large portion of the colonists to those gold fields, but drew to the colony a large amount of wealth, the consequence of the gold discoveries, without at the same time creating any extreme derangement of society, as is usually the case in such circumstances.

The southern part of South Australia is wonderfully productive. The finest wheat in the world is grown within a few miles of its capital, as well as remarkably heavy oats and barley.

Crops.

At the agricultural exhibition of 1855, the weight of the prize cereals was, wheat, 65 lbs. 12 oz., 64 lbs. 14 oz., and 64 lbs. 15 oz. Oats, 44 lbs. 2 oz., 45 lbs. 13 oz., and barley, 59 lbs. 2oz., the bushel measure; and more recently at this year's exhibition at South Kensington and at Vienna, Mr. C. B. Fisher of Buckland Park, showed a bag of fine wheat

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weighing 69 lbs. per bushel, growing on his Hill River estate, besides other samples from other districts of the colony, weighing 68 lbs. His other exhibits were merino wool, and photographs of sheep and horses bred in the colony. The only other exhibitor of wheat was Mr. W. Brooks, Woodchester, whilst fine samples of flour were shown by Messrs. Bowman, Magarey and Co., and Harrison and Co., of the Middleton, Hindmarsh, and Gawler Steam Mills.

Of these, Mr. Fisher, Mr. Brooks, and Messrs. Harrison received medals for merit, whereas Messrs. Magary and Co. received the diploma of Honourable Mention.

Wool.

The following table, giving the total exports of wool from the colony during a period of 10 years, including 1871, is taken from the *Statistical Register*, and it shows how the value of this industry has been gradually increasing year by year, and of what importance it is now to the colony:—

TOTAL EXPORT OF WOOL.

Year.	Quantity. lbs.	Value. £
1862	13,229,009	635,270
1863	15,566,787	715,935
1864	16,092,095	775,656
1865	16,269,890	821,482
1866	19,739,523	990,173
1867	19,350,195	919,532
1868	28,899,190	1,305,280
1869	27,022,671	1,008,669
1870	25,908,728	902,753
1871	28,539,567	1,170,885
1872	33,709,717	1,647,387

Produce and value of wheat crops

The following table gives for 11 years the number of acres under wheat, the produce in bushels, the average per acre, and the average price per bushel in Adelaide:—

Season.	Acres under Wheat.	Produce Bushels.	Average per Acre.	Average Price.
			bush. lbs.	*s.* *d.*
1862–3	320,160	3,841,824	12 0	4 10
1863–4	335,758	4,691,919	14 0	7 10
1864–5	390,836	4,252,949	11 0	8 7
1865–6	410,608	3,587,800	8 44	6 2
1866–7	457,628	6,561,451	14 20	4 5
1867–8	550,456	2,579,879	4 20	7 1
1868–9	533,035	5,173,970	9 42	5 0
1869–70	532,135	3,052,320	5 45	5 3
1870–1	604,761	6,961,164	11 30	5 0
1871–2	692,508	3,967,069	4 20	5 6
1872–3	759,476	8,735,912	11 30	5 4

South Australia.

It will be seen from the returns of the harvest of 1872–3 that there were about 759,000 acres under wheat, and that the average per acre was over 11 bushels. There will be therefore nearly 200,000 tons for export, a considerable portion of which has already been shipped. 200,000 tons of breadstuffs, at the very moderate estimate of 10*l.* per ton, gives 2,000,000*l.* sterling as the result of the harvest, after supplying all local wants. This fact shows how important the agricultural interest is to the colony generally. That South Australian wheat and flour are the finest produced in the world, is seen by the fact that in London they fetch the very highest price, and in the other colonies they are bought to mix with their own cereal produce.

Other produce.

But wheat is only a part of the colony's produce. Every fruit that grows in England thrives in South Australia. Apples, pears, cherries, strawberries, filberts, almonds, and currants are produced in the south, in addition to an abundant growth of fruit which in England is only raised under glass, such as grapes, peaches, nectarines, and figs, which flourish with little culture in the open air in South Australia. Mr. Wm. Harcus, J.P., whose handbook for emigrants has been of much assistance to me in the preparation of this report, states that oranges do wonderfully well, and that all the fruits to which I have referred, which are luxuries to the English people, are the common food of the poorest class in South Australia. The only exhibitor of preserved fruits at Vienna was Mr. F. C. Davis, of Adelaide.

In the northern part of the colony tropical fruit grows to any extent, and tropical industries are tended with suitable labour. Here we find the sugar cane, the banana, cotton, rice, tea, and coffee; and the time is not far distant when by a greater influx of labour these products will be fully cultivated and swell the already large exports of the colony.

Wines.

Wines.

There is also no doubt that some of the Australian colonies, and especially South Australia, are destined to become the wine-growing countries of the future. Even as early as 1862 there were over 3,500 acres of vines under cultivation in South Australia, and some 300,000 gallons of wine were made, which was increased in 1871 to 800,000 gallons.

As the manufacture of wines becomes to be better understood, many millions of gallons will in the future be produced annually. Of course some of that which is made is inferior, owing to unskilful manufacture, notwithstanding the excellence of the grapes. Nevertheless, more than sufficient is every year made to enable competent judges to pronounce it

excellent. This has been proved at several exhibitions, and most recently at Vienna, by the prizes allotted to the wines of South Australia.

There was at the "Weltaustellung," in the Austrian capital, a most excellent display of South Australian wines. In red wines there were—"Tintara," "Beaumont," "Mataro," "Highercombe," "Pommard," "Glenelg," "Riesling." In white wines—"Highercombe," "Temperana," "Pedro Ximenes," "Doradillo," "Riesling;" besides liqueurs—"Muscatel," "Shiraz," "Donzalino," exhibited by the Australian Vineyard Association, whose office is at 50, Old Broad Street. This association received the medal for Progress.

Of direct importations there were red and white Riesling from Mr. Wm. Green, Gawler Park; Mr. Patrick Auld, *Auldana Vineyard*; Mr. J. Gilbert, Pewsey Vale, and the Tintara Vineyard Association, Adelaide.

AGRICUTURE.

Of all the British colonies South Australia exhibits the most striking picture at present of farming industry, and on the whole seems to be the place where, good as the labourer's condition may be elsewhere, he has, by prudence and industry, the best chance of rising in the social scale and becoming in his turn the employer of labour.

As early as 1854, only 18 years after the foundation of the colony, no less than 127,165 acres of land were under the following crops:—

	Acres.
Wheat - - -	89,945
Oats - - -	4,359
Barley - - -	6,454
Hay - - -	23,402
Maize - - -	42
Potatoes - - -	1,712
Vineyards - -	409
Orchards - - -	451
Other crops - -	391

Upon those lands there were kept depastured, irrespective of the cattle roaming on the waste lands under leases to stockholders for 14 years, 10,184 horses, 29,638 cows, 21,923 bullocks, 22,659 calves, 193,749 sheep, 830 goats, and 17,343 swine.

The total value of the grain, flour, hay, potatoes, butter, and other farm produce exported in that year (1854) amounted to 411,978*l.*, of which grain made up 40,717*l.*; flour, &c., 275,550*l.*; and hay, 83,289*l.*

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In the same year wool to the value of 182,419*l.*, and copper and copper ore to the value of 91,796*l.* were exported.

Comparative value of exports, &c.

On comparing the value of exports in 1854 with what they are now, it will be seen that the three great staples which have made the colony what it is, are agriculture, pastoral pursuits, and copper mining.

When the first colonists arrived the land was dried, parched up, and appeared unworkable. For some time they were content to sit down with the conviction that agriculture was impossible. In those early days flour was actually imported from a neighbouring colony at the rate of 100*l.* a ton, and suffering to a great extent resulted from the simple lack of adventure. Writing now, when, after supplying its own wants, South Australia can export some 200,000 tons of breadstuffs, it seems absurd to think that the early settlers could ever have entertained a doubt as to the productiveness of the soil. For some time agriculture was confined to a small radius, but as the wonderful recuperative power of the soil was proved it soon extended, as the following comprehensive table will show. Glancing at this table, we are brought face to face with the colony as it exists at the present moment, and to its present state and future prospects our further remarks must be confined:—

—	Population.	Acres under Cultivation.	Sheep.	Imports.	Exports.
1855	85,821	130,000	1,750,000	1,370,938	988,215
1861	126,830	486,667	3,038,356	1,976,018	2,032,311
1866	163,452	739,714	3,911,610	2,835,142	2,858,737
1871	185,626	1,044,656	4,412,055	2,158,022	3,582,397
1872	192,000	1,164,846	4,900,687	2,801,571	3,738,623

—	Revenue.	Expenditure.
	£	£
1855	453,641	689,696
1861	558,586	482,951
1866	949,774	1,064,323
1871	778,094	759,477
1872	697,442	700,200

Public debt, 1871 - - - 2,284,200*l.*
Crown land sold - - acres 5,037,590

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There are now 25 counties, containing 39,287 square miles, or 25,143,680 acres, which have been proclaimed, embracing the principal agricultural and pastoral settlements situated within easy distance of the capital or a shipping port. The pastoral districts at present occupied for pasturage only contain 70,000 square miles, leaving 270,000 miles still open for settlement. The greater part of this unoccupied territory lies to the north, through which a line of communication has been opened by the construction of the transcontinental telegraph of 2,000 miles in length, and the establishment of telegraph stations, to which cattle runs are already being formed, the route across the continent being now travelled with comparative ease. There can be little doubt that the explorations now being made on either side of the telegraph line will result in the discovery of large tracts of valuable pasture country in addition to that already known, of which 6,324 square miles have already been taken up under pastoral regulations.

Many who read this report will hardly be prepared to believe that South Australia has nearly 5,000,000 sheep, whilst all Ireland has only about 4,250,000; or that the consumption of what are luxuries here, but what have become necessaries there, is comparatively five or six times as great in South Australia as in England.

At a moment when our population is hurrying in great numbers to America, it may be as well to let them know these facts, in order that they may reflect on the superior inducements they will find in a colony where there is peace, abundance, true freedom both in civil and religious matters, and a greater amount of comfort amongst the labouring classes than can be attained or even hoped for in this country.

The cost of cultivation in South Australia is very small compared with that of other countries. Anything like scientific farming is quite unknown. Virgin soil is ploughed up three or four inches deep, and often without even fallowing it the seed is thrown in. Should the season be fair a good crop rewards the small labour of the husbandman. Though the farming is what in England would be called slovenly, yet as a whole, and over a series of years it answers the purpose and expectations of the agriculturist.

In the "Times" of October the 31st, 1873, it is stated that there is not a single able-bodied pauper in the colony. The new Government proposes to spend 35,000*l.* upon the introduction of fresh population, and 110,000 acres of land are

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already selected. It is further stated that a railway across the continent is proposed, and that capitalists who undertake to construct the line will get alternate blocks of land and all the minerals in them.

Full particulars as to how the emigrant should get and cultivate land when he has got it are to be found in the admirable pamphlet to which I have referred, and which can be obtained of Mr. F. S. Dutton, C.M.G., the accomplished agent for the colony. It is there pointed out that, although wheat growing has hitherto been the chief pursuit of those who have obtained land in the colony, there are other industries which, in view of the uncertainty in the crops of that staple, it is advisable that settlers should turn their attention to.

Wheat growing will doubtless continue to be the great staple industry of the colony, but it is suggested by Mr. Harcus that other and subsidiary pursuits should nevertheless be followed. As before stated, any kind of English fruit will flourish in the colony; fine samples of muscatel raisins, almonds, dried apricots, and other fruits were exhibited at the Intercolonial Exhibition of 1866-7, as well as at Vienna. It has also been asserted, and, the same question is attracting public attention in the neighbouring colony of Victoria, that sericulture, or the breeding of silkworms for the production of silk, could very profitably be pursued in the colony. Recent accounts show that a company called the Silkworm Company has already been constituted, and is planting in South Australia a large number of white mulberry trees.

Minerals.

The visitor to the Vienna Exhibition, owing to the absence of any minerals in the South Australian court, would hardly have supposed that as well as being an agricultural country the colony is rich in mineral deposits. The chief mineral product is copper, and the credit of the discovery is due to Mr. F. S. Dutton, who, in his search for some straying sheep in 1843, discovered the rich ore cropping out on the surface of a spot which afterwards was famous as the site of the valuable Kapunda mines.

Copper mines.

The ores comprise every variety, as yellow ore or pyrites, blue and green carbonates, muriates, grey and black sulphides, oxides, bell metal, and native copper or malleable. The Kapunda mine was soon to be eclipsed by the famous Burra Burra mine discovered in 1845, which was worked by a few persons in Adelaide who constituted themselves into a company called the South Australian

Mining Association. These shares were issued at 5*l.*, and they have been sold for 250*l.* each. The total dividends paid on the capital, consisting of 12,320 shares, have amounted to 782,320*l.*

The Burra Burra mines were, however, to be in their turn eclipsed by the Wallaroo mines, which are about six miles from Wallaroo Bay. The ores are said to average 15 to 25 per cent. in richness, and there are over 500 men employed at the mine and the smelting works in connection with it.

This discovery has again been eclipsed by the Moonta mines. Not a penny of the capital was even subscribed, and the shares, 32,000 in number, are now quoted at 22*l.* 5*s.* Thus a property which cost the shareholders nothing, is now valued at 712,000*l.*, and dividends amounting to 728,000*l.* have been paid.

It is believed that the colony is only now on the threshold of its mineral discoveries, and that copper is freely scattered over its immense territory. In the north, mines of great wealth have been discovered; and it is averred that 200 miles north of Port Augusta the country is full of copper, whilst in the northern territory itself, 150 miles south of Port Darwin very rich gold quartz reefs have been discovered which are now in course of active development. If the railway across the continent to which I have before referred is constructed, an enormous population will doubtless be attracted to settle along its route, and the produce of the mines already existing and those yet to be discovered can be conveyed cheaply and profitably to Port Adelaide or Port Darwin.

Leases of waste lands may be obtained for mineral purposes on the most liberal terms, and every facility is given by the colony towards those who may wish to better themselves and develope its resources in this direction.

The total quantity of land sold during the first five months of 1873 for cash was 21,817 acres, yielding 32,276*l.* The total quantity on deferred payments was 124,458 acres, at an aggregate amount of 192,530*l.*

The present drawback is scarcity of labour, but every exertion is being made by the Government to meet that want.

I annex a table giving the return of the quantity and value of minerals, produce of the colony exported within the last 11 years.

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Years.	Copper. Quantity.	Copper. Value.	Lead. Quantity.	Lead. Value.	Copper Ore. Quantity.	Copper Ore. Value.	Lead Ore. Quantity.	Lead Ore. Value.	Regulus. Quantity.	Regulus. Value.	Total Values.
	Cwts.	£	Cwts.	£	Tons.	£	Tons.	£	Tons.	£	£
1862	85,872	400,591	426	981	6,216	124,263	97	2,266	418	19,518	547,619
1863	96,039	447,954	271	525	5,343	83,262	45¾	9,007	39	1,655	542,393
1864	134,055	637,791	63	121	4,545	38,125	56¼	13,107	52	2,480	691,624
1865	100,196	433,795	82	133	16,176	184,677	8½	1,507	—	—	620,112
1866	129,272	584,509	1,321	2,991	16,824	225,683	648	11,318	—	—	824,501
1867	156,863	627,384	3,391	5,464	11,430	113,409	212	3,353	25	560	753,413*
1868	104,227	400,691	3,049	5,670	20,725	207,519	76	1,245	10	213	624,022†
1869	92,788	371,566	2,936	4,471	26,835	250,259	24	296	—	—	627,152‡
1870	109,421	394,919	2,564	4,089	20,886	173,881	3	21	—	—	574,090§
1871	127,911	518,080	3,381	5,497	20,127	119,903	—	—	—	—	643,569‖
1872	149,050	680,714	—	—	26,694	122,020	61	2,824	—	—	806,364

General remarks.

I mentioned that in 1854 409 acres of vines were in cultivation.

In 1862 there were 3,918 acres of vineyard, and 312,021 gallons of wine made.

In 1871 the amount of vine cultivation had increased to 6,131 acres, and 801,694 gallons were made, of which 21,788 gallons were exported. Looking to this great increase it may fairly be said that South Australia must be now regarded as one of the wine producing and exporting countries of the world. Next to agricultural produce and mining, the largest amount of capital and labour is devoted to the cultivation of the vine. In the neighbourhood of Adelaide, some of the vineyards exceed 100 acres in extent, and many are between 40 and 50 acres.

There seems to be no reason why, with proper experience and skill, wines as good as the port and sherry so much consumed in England should not be exported from South Australia.

Of the choicest sorts of the white wine class may be named Riesling and Verdielho, whilst Donzellinha, the Mataro, and Grenache yield wines of the character of port and Roussillon. These wines are generous, well flavoured, full of body, and rich in bouquet. Very wisely the Australian wine growers have not attempted to imitate wines already familiar to the English palate.

For information as to prices of food and clothing, and as to

* Includes bismuth, 4 cwt., 231*l.*; bismuth ore, 19 tons, 1,830*l.*; and copper precipitate, 17¼ tons, 1,182*l.*

† Includes bismuth, 10*l.*; bismuth ore, 25 tons, 1,035*l.*; and copper precipitate, 160 tons, 7,639*l.*

‡ Includes bismuth ore, 42 tons, 590*l.*

§ Includes bismuth ore, 73 tons, 1,130*l.*; and silver ore, tons, 70*l.*

‖ Includes bismuth ore, 223 tons, 4,720*l.*; spelter, 12 tons, 369*l.*

rates of wages, the reader, if he is so disposed, can obtain all the information he may require from either the Emigration Commissioners Report, or from the agent-general for the colony. Without going into details, it is enough to say that a man, his wife, and four or five children can, on 25*s.* or 30*s.* a week, live as no working man in England can expect to live. The wages range from 6*s.* a day for a common labourer to 9*s.* 6*d.* or 10*s.* for a skilled mechanic. A leg of mutton, which in this country costs 7*s.* or 8*s.*, may be purchased in South Australia for 3*s.*, and with the exception of house rent, which is from 6*s.* to 8*s.* a week for the labouring classes, money will bring far more than in England.

The yeomanry, who have found a home in South Australia, and who are at once tillers of the soil and employers of labour, are more than any one class the real bone and sinew of the colony, and the industry which has so widely covered the land with farms, homesteads, tillage, and fencing of every description, has probably never been equalled in its result in any British colony in the same number of years by the same amount of population.

It is by the spread of agriculture that the greatest amount of industrial prosperity has been created, and the real settlement of the country most effectually accomplished.

The shepherd and miner can hardly ever have the same interest in the country as the owner of a homestead, however small may be his holding. If it were necessary it would be easy to quote many instances of men who have taken up land with no capital but their own strong arms and brave hearts, who have successfully met and conquered difficulties, and who are now in wealthy circumstances. But those who have done this have worked hard, have been economical and saving in their habits, and have practised the great virtues of industry and self-denial.

Men of this stamp cannot but succeed in a new colony like South Australia.

Summary.

The remarks which I have made in regard to the colony, and which indeed, to do justice to the subject, might be almost indefinitely prolonged, may be shortly summarized in concluding my report.

The few settlers who inhabited the colony 37 years ago have grown into a population of some 200,000 souls. The amount of land under cultivation is more than 1,100,000 acres, of which nearly 800,000 are devoted to wheat. At

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the end of 1871 there were more than 6,000 acres of vineyard, from which over 800,000 gallons of wine were made. Valuable and productive gardens are connected with nearly every home in the country within 150 miles of Adelaide, and the city is abundantly supplied with fruit and garden produce.

There are 85,000 horses, 145,000 head of cattle, and 4,900,000 sheep in the colony, that is more than 20 sheep to each man, woman, and child. There are 2,000 miles of telegraph wire in the transcontinental line alone, which connects Port Augusta with Port Darwin. The exports from a few thousand pounds have reached a total of 3,730,000*l.*, and the imports exceed in value 2,800,000*l.* The revenue and expenditure are between 700,000*l.* and 800,000*l.* per annum, the taxation only about 25*s.* per head. There is not an able-bodied pauper in the place, and there is room for thousands of respectable emigrants, all of whom, with care and forethought, may hope to attain a degree of comfort which is not to be found amongst the poorer classes in Europe.

The mining industries of the colony are assuming greater proportions day by day, the northern territory is known to team with mineral wealth, and when the great line of railway reaching from Port Adelaide to Port Darwin is constructed, as it is certain to be, millions of acres of new and unsurveyed land will be opened up to the enterprising settler.

In such circumstances it is safe to say that it would be quite impossible to place any limit on the future progress and prosperity of South Australia, and of the community which it contains.

The commissioner for the colony at Vienna was Mr. F. S. Dutton, C.M.G., whose London address is 37, Great George Street, Westminster.

TRINIDAD.

TRINIDAD

Geographical position.

Is an island lying to the north-eastward of Venezuela, between N. latitude 10° 3′ and 10° 50′ W., longitude 61° and 62° 4′ west of Greenwich. Its length is 65 miles on the southern and 53 miles on the northern side, and its breadth on the eastern and western sides respectively 48 and 49 miles. It is separated from the continent of America by the Gulf of Paria, into which fall the northern mouths of the Orinoco. It was discovered by Christopher Columbus on the 31st July

1498, and first colonized in 1588 by the Spaniards. In 1676 the French possessed it, but it was soon restored to Spain. TRINIDAD.

On the 12th February 1797 an expedition for the reduction of Trinidad sailed from Martinique; on the 14th it put into Carriacou.

This expedition, commanded by Admiral Harvey and Sir Ralph Abercrombie, resulted in the surrender of the island to His Majesty's arms, and on the 18th February, 1797, the articles of capitulation were signed. Early history.

On the 29th March 1802 the definitive treaty of peace between England and France and her allies, viz., Spain and the Batavian Republic, was signed at Amiens. By the third article all places taken during the war by Great Britain were to be restored, save Trinidad and Ceylon; and in the fourth article "His Catholic Majesty cedes and guarantees, in full "property and sovereignty, the island of Trinidad to His "Britannic Majesty."

The area of the island is 1,754½ square miles, giving an acreage of 1,122,880, of which 90,271 are cultivated. Area.

Port of Spain is the chief town and port of entry. This town, according to the census of 1871, contains 23,561 inhabitants, of whom 11,065 are males and 12,496 females. The second town and port of entry is San Fernando, 26 miles south from Port of Spain, with a population of 5,006 inhabitants. There are also the minor inland towns of St. John, St. Joseph, Aronca, and Arima, all to the eastward of Port of Spain. The harbour is considered the finest in the West Indies.

The climate of Trinidad is, generally speaking, very healthy, the temperature ranges in the shade from 70 minimum to 85 maximum. The thermometer in the months of December and January at 4 o'clock, a.m., has been known as low as 68. The rainy season generally commences about the middle of June and ends in December. The yearly average fall of rain is 77 inches—that is, according to the rain gauge kept in Port of Spain. The fall is heavier in some parts of the island, where the exact average, however, cannot be ascertained, as no account is kept by the residents. The island is totally free from hurricanes. Climate.

The population in 1871 amounted to 109,638, 60,405 males and 49,233 females, of the following classification: Trinidad, 56,692; British Colonies, 13,707; United Kingdom, 954; Foreign, 4,779; China, 1,400; India, 22,880; Africa, 4,256; born in the colony of Indian parents, 4,545; Population.

TRINIDAD.

nondescribed, 425. The total increase of population since the last census in 1861 is 28,200, or 30 per cent.

Govern-ment.

CONSTITUTION.

The government is administered by a governor and an executive council of three members. There is also a legislative council, including the governor, who is president, six official and eight unofficial members, all of whom are nominated by the Crown. There is no representative assembly.

Revenue.

REVENUE.

The revenue of the colony in 1850 was 88,084*l.* The net revenue received in 1872 applicable to the general service of the colony, including immigration, was 296,060*l.* This compares very favourably with the revenue of the preceding five years, which stood as follows:

	£
Net revenue of 1867 - -	200,908
,, 1868 - -	197,138
,, 1869 - -	236,240
,, 1870 - -	225,733
,, 1871 - -	264,352
,, 1872 - -	296,060

Most of the items of revenue give larger returns. Imports show an increase of 12,353*l.*, and rum duties of 12,907*l.* The receipts from the sale of land are also double what they were in 1871.

Produce.

The soil is rich, and produces, in addition to the cane, cacao, coffee, and cotton, the latter of which is not as yet much cultivated, numerous kinds of timber, of which 222 samples were sent to Vienna, and the choicest fruits. Immigration from India is fully encouraged by the government. The amount expended in immigration in 1872 (exclusive of the cost of the fixed establishment of the immigration department) was 63,162*l.* The census of 1861 showed a total of 13,488 Indian coolies and 461 Chinese. The importation of Chinese is at present wholly discontinued, a few only having been introduced in the course of the past 10 years (viz., in 1863 and 1865), but the introduction of Indian coolies has been continuous, and there are now 21,177 immigrants on estates in the colony, 4,000 or 5,000 free coolies, besides nearly 5,000 children born in the island of Indian parents.

RETURN of IMMIGRANTS introduced in the COLONY from 1858 to 1872, with the number that have returned during that period :— TRINIDAD.

COOLIES. Coolies.

Years.	Males.	Females.	Boys.	Girls.	Total.
1858	1,059	658	222	163	2,102
1859	1,907	885	235	222	3,249
1860	1,327	515	166	116	2,124
1861	1,783	511	118	111	2,523
1862	1,212	281	64	26	1,583
1863	1,390	299	48	29	1,766
1864	685	179	35	21	920
1865	1,830	523	185	132	2,670
1866	329	84	32	14	459
1867	1,860	986	12	7	3,186
1868	993	293	31	20	1,337
1869	1,658	916	315	223	3,112
1870	1,086	476	134	92	1,788
1871	1,340	483	81	82	1,986
1872	2,046	959	268	167	3,440

There were also 164 infants, 6 not denoted.

Number of immigrants returned :—

COOLIES.

Years.	Males.	Females.	Boys.	Girls.	Total.
1858	246	54	36	26	362
1859	—	—	—	—	—
1860	—	—	—	—	—
1861	236	34	13	20	303
1864	—	—	—	—	—
1865	354	87	35	32	508
1869	211	78	34	28	351
1870	215	98	40	35	388
1871	94	39	8	17	158
1872	—	—	—	—	398

The expenditure of the colony in 1850 was 77,362*l.*; in 1867 and the following years it was as follows: Expenditure.

	£		£
1867 -	214,715	1870 -	241,148
1868 -	199,112	1871 -	234,175
1869 -	234,791	1872 -	285,384

Debt.

It was stated in the Blue Book Report for 1872, that, with the exception of a small balance of about 4,500*l.* due in the guaranteed loan, the colony might be said to be free from debt.

The principal articles of produce exported are sugar, rum, molasses, cacao, coffee, cocoa nuts, and pitch. The number of sugar estates is about 150, and those of cacao and coffee Produce.

TRINIDAD. 800. The total extent of land under cultivation according to the assessment made in 1868 was 77,452 acres, as follows: Canes, 41,639 acres; cacao and coffee, 16,020 acres; ground provisions, 11,209 acres; cocoa nuts, 2,064 acres; pasture, 6,520 acres. In 1872 the total amount was as before stated 90,271, showing a very great increase in the acreage under cultivation. Value of imports and exports:—

Trade.

	Imports.	Exports.
1850 -	476,910 -	319,394
1867 -	859,389 -	1,086,901
1868 -	987,796 -	1,116,198
1869 -	920,607 -	1,118,695
1870 -	1,042,678 -	1,227,574
1871 -	1,218,024 -	1,492,811
1872 -	1,233,771 -	1,439,904

Notwithstanding the prevalence of smallpox during the greater part of the year 1872, and the strict quarantine which was enforced against Trinidad by all the neighbouring colonies, the trade of the island does not appear to have suffered.

Of the total imports the United Kingdom furnished 104,000*l.* more than it did in 1871, but Venezuela shows a decrease of 90,000*l.* The imports from the different countries were valued as follows:

	£
United Kingdom - -	639,739
British possessions - -	209,862
United States - -	205,473
Venezuela - - -	57,075
France and French colonies -	90,984
Other countries - -	30,638
	£1,233,771

Of goods exported the distribution was:

	£
United Kingdom -	- 1,125,315
British possessions -	- 34,484
United States -	- 73,270
Venezuela - -	- 108,548
France, and French colonies -	29,564
Other countries -	- 68,725
	£1,439,904

As compared with 1871, which, however, was an exceptionally good year, sugar shows a slight falling off, the crop

Trade.

of sugar having been less by 150,000 cwt.; the actual figures are, export of 1871, 1,071,839 cwt.; 1872, 920,464 cwt.; the difference in the estimated value was 120,000*l.* Fortunately, however, this loss in the staple is somewhat balanced by increased exports of other produce, and the total decrease is less than 50,000*l.* In Cacao, the quantity exported increased from 57,339 cwt. in 1871 to 62,374 cwt. in 1872. Asphalte rose from 3,271 tons to 13,580 tons, and the value of cocoa nuts and cocoa fibre from 8,732*l.* to 10,274*l.* The increase in the latter export would have been greater had it not been for the failure of the mercantile firm which carried on the cocoa nut fibre manufacture. Samples of both cocoa and asphalte, which will be noticed hereafter, were exhibited at Vienna.

The carrying trade of the island was performed in 639 vessels, with an aggregate capacity of 219,449 tons, of which 614, representing 214,329 tons, were entered at Port of Spain, and the remainder at San Fernando. The number of vessels was less, but the tonnage more than in the preceding year.

Sugar cultivation and manufacture.

The great increase in the exports in 1871 was largely due to the excellent sugar crop, which yielded 1,071,839 cwt., being 30 per cent. more than the crop of 1870. The last 10 years export of sugar, the staple produce of the island, ending with 1871, was as follows:—

Export of sugar,	1861	549,464 cwt.
„ „	1862	738,117 „
„ „	1863	668,255 „
„ „	1864	706,246 „
„ „	1865	560,166 „
„ „	1866	813,339 „
„ „	1867	828,116 „
„ „	1868	830,708 „
„ „	1869	929,365 „
„ „	1870	819,043 „
Average of 10 years ending 1871		744,281 „
Export of sugar,	1871	1,071,839 „
„ „	1872	920,464 „

With regard to improvements in the manufacture of sugar, it is noticeable that a large usine capable of manufacturing 50 hogsheads per diem has been erected on one of the estates in the colony. There has also been a great improvement in the machinery used on several other estates, and there appears to be no want of capital. Road traction

TRINIDAD. engines are coming more frequently into use, and a railway from Port of Spain to Arima will shortly be constructed, which will be of great service to the planting interest, and the commencement of a system which will doubtless soon be extended to other portions of the island.

The amount of unmanufactured tobacco included in the exports for 1872 was 315,100 lbs.

Balata gum.

BALATA GUM.

Amongst the few exhibits from Trinidad at the Vienna Exhibition was, 1, a bottle of balata gum in a milky state as drawn from the tree, and 2, samples of the same gum coagulated with spirits of wine. This gum was, till lately, obtained from the bark of the "Mimusops globosa," the trees being felled and the bark stripped off, but it can be obtained from simply tapping the bark, and thus preserving the tree. The subject has for some time been under the consideration of the Professor of Chemistry at the Queen's Royal College in Trinidad, who has prepared some blocks of the gum which it is believed he proposes to have tested in this country.

It is thought that the balata gum can be converted to the same uses as gutta percha, and in that case it will most probably become a valuable article of export. The cost of collecting the gum is trifling, and the supply of balata trees abundant. British Guiana, with its immense range of virgin forests, also abounding with the balata tree, would of course benefit by this product, if it should prove remunerative as an article of commerce.

Cocoa.

COCOA.

Mr. Daniel Hart, in his history of the island, states that the cultivation of cocoa, with the exception of a small quantity grown in the islands of Jamaica and Grenada, is peculiar as an article of British production to Trinidad. With the exception just mentioned, Trinidad is the only colony throughout the wide extent of the British colonial empire producing the materials for this wholesome and palatable beverage. In 1827 the number of cocoa trees amounted to 3,091,945, and the quantity exported that year was 3,696,144, valued, according to official returns, at 57,851*l.* After 1827 a sudden depression in the price of the article reduced the cocoa proprietors at once, and without warning, from a state of affluence to one of comparative destitution. For the last 10 years, however, the article has maintained a fair and remunerative price. The cocoa tree itself, of some 20 feet in height, and affording a grateful shade from the blaze of the sun, is again shaded in its turn by the *bois immortel*, whose

protecting services have justly obtained for it among the South Americans the appellation of La Madre del Cacao. The weeding of the soil, picking of the pods, husking them, and carrying the produce to the drying house, in short, the whole of the agricultural operations, and all but the last stage of the manufacturing process, is carried on under this impervious canopy. Each cocoa tree ought to yield annually 2½ pounds net of cocoa.

The samples of cocoa in the Vienna Exhibition were from the estate of Sir Joseph Needham, chief justice of the colony.

ASPHALTE.

Asphalte

The asphalte shown by Mr. Finlayson, is taken from the Pitch Lake, at the village of La Brea, on the western coast, which is about 35 miles from the capital, Port of Spain. The lake is about three quarters of a mile from the sea, and of 110 acres in extent. The asphaltum is practically inexhaustible. As fast as the bitumen is removed it is filled up from below.

The Epureé asphalte is boiled on the spot, and sells chiefly in Germany and France, which countries are also the best customers for the crude asphalte.

The exports since 1867 have been as follows:

1868 - - - -	2,521 tons.
1869 - - - -	1,802 „
1870 - - - -	7,295 „
1871 - - - -	1,866 „
1872 - - - -	9,327 „
1873 (to 31st August) - -	6,674 „

The price for delivery in this country is 46*s.* per ton for crude, and 75*s.* per ton for Epureé. Messrs. Previte and Greig, 3, Newman's Court, Cornhill, are the sole importers of Trinidad asphalte.

A good many enquiries in regard to this production have been prosecuted at Vienna.

MINERALS.

Minerals.

Large pieces of iron ore have been obtained. Sulphate of copper and brilliant copper pyrites are also found amongst the extinct volcanoes of the island.

WOODS.

Woods

There was a collection of 222 specimens of timbers and ornamental woods at Vienna, selected by Mr. S. Devenish, whose exertions on behalf of the colony at its exhibition of 1852, and at the Paris exhibition of 1867, were so much

TRINIDAD.

appreciated. The collection was arranged and classified by Dr. Hochstetter.

Woods.

These woods, of which there is an inexhaustible variety in the island, have been returned to Trinidad in order that, if possible, even a more complete selection may be made and sent back to this country for the purpose of being placed in the proposed colonial annexe at the South Kensington Museum. For full information on the subject of the woods indigenous to the Island, I would refer to M. de Verteuil's book, which contains, amongst other most interesting matter, a chapter on the Flora of Trinidad by Herman Crüger.

Provisions and labour.

The price of provisions in Trinidad is high.

The demand for continuous agricultural labour is considerable.

In order to keep up the present sugar and cocoa cultivation of the island, an annual introduction of from 2,000 to 3,000 immigrants is required.

The ordinary rate of wages is from 1*s.* to 1*s.* 3*d.* a day; ploughmen, 4*s.* 2*d.* per day, house and garden free. Able trenchers can make 2*s.* 6*d.* a day of from eight to nine hours. A great deal of labour, however, is paid for as task work, and a good field hand can make from 40 to 60 cents. a day of nine hours in tasks on a cane plantation.

SUMMARY.

Trinidad has a climate admirably suited to Africans and their descendants, to Chinese and Indians, and it is not unhealthy for Europeans. It has a soil so rich that guano has hardly yet been used as a fertilizing agent. It produces the cane, cocoa, coffee, cotton, yams, plantains, sweet potatoes, rice, corn, and manioc. The country is abundantly wooded and watered, and it has a situation which should make it the *entrepôt* for the trade of the Northern States of South America.

With these immense natural advantages, Trinidad, with a denser population, with improved means of internal communication, and with greater shipping facilities, should become one of the most prosperous of British colonies. A great central factory, or usine, before alluded to, erected by the colonial company for the use, not only of their own estates, but of any neighbours who may bring their canes to it, has, by separating manufacture from cultivation, marked a new era in the production of sugar in Trinidad.

As reference has been made to the recent epidemic of small pox, it should be mentioned that since then the island has been divided into districts with vaccinators for

each. There is also a sanitary inspector with sub-inspectors under him, who report daily on the state of public health, and the entire system of drainage is now under the consideration of the government. TRINIDAD.

The proposed line of railway will pass through a swamp lying to the east of Port of Spain, and will in a great measure be the means of draining this swamp and removing a cause of sickness in that part of the town.

VICTORIA. VICTORIA.

Victoria, the most populous and wealthy of the Australasian colonies, is situated at the south-east of the continent of Australia, and lies between the 34th and 39th parallels of south latitude and the 141st and 150th meridians of east longitude. Its extreme length from east to west is about 420 miles, and its greatest breadth is about 260 miles. Its extent of coast line is nearly 600 miles. Victoria was separated from New South Wales in 1851. It is bounded Position. on the west by the colony of South Australia, the dividing line being the 141st meridian. On the north and north-east it is bounded by the colony of New South Wales, from which it is separated by the River Murray, and a line reaching from the head waters of that stream, at Forest Hill, to Cape Howe. On the south and south-east its shores are washed by the Southern Ocean.

In consequence of its position at the extreme south of the Australian continent, Victoria is often mistaken by English writers and others not well acquainted with Australian geography for an adjoining colony, which is topographically misnamed South Australia; the truth being that only a very small part of South Australia is situated farther south than even the most northern portion of Victoria.

The southernmost point in Victoria, and consequently in the whole of Australia, is Wilson's Promonotory, which lies in lat. 39° 7′ S., long. 146° 26′ E.; the northernmost point is the place where the western boundary of the colony intersects the Murray, lat. 34° S., long. 140° 58′ E.; the point furthest east is Cape Howe, situated in lat. 37° 30′ S., long. 149° 59′ E.; the most westerly point is the whole westerly frontier, which lies upon the meridian 141° E. (as has been already stated) and extends from lat. 34° S. to lat. 38° 4′ S., or more than 240 miles.

The area of Victoria is 88,198 square miles, or 56,446,720 Area.

VICTORIA.

acres. The whole continent of Australasia is estimated to contain about 3,000,000 of square miles, and Victoria consequently occupies about one 35th part of its surface. Great Britain, exclusive of the islands in the British seas, contains 89,644 square miles, and is therefore slightly larger than Victoria.

From its geographical position Victoria enjoys a climate more genial to Europeans than any other colony within the continent of Australia. In regard to heat, the weather is never severely oppressive except during the prevalence of hot northerly winds, and these occur only at intervals during the summer months. The mean temperature at Melbourne is 57°.

According to Professor Neumayer, the average number of hot winds for the colony is eight or nine per annum.

Climate.

Ice is occasionally seen during the winter months, the number of frosts and severity of the weather depending upon the physical features of the country.

The hottest month in Melbourne is January and the coldest July.

The principal geological feature in Victoria is the volcanic region, which extends over an area of some 300 miles from east to west and 100 to 150 miles from north to south. There are numerous craters, but no volcanoes in existence at the present time.

Government.

The Government of Victoria consists of a Governor appointed by the Crown, who is aided in the conduct of public affairs by a responsible ministry. There is a Legislative Council of 30 members elected for six provinces, and an Assembly of 78 members returned by the 49 electoral districts. The constitution was established by an Act passed by the Legislature of Victoria, 1854, to which Her Majesty assented in pursuance of the power granted by Act of the Imperial Parliament (18 & 19 Vict. cap. 55). One of the members of Council returned for each of the electoral provinces retires in rotation at the expiration of every two years. The qualification of members is possession of freehold property worth 2,500*l.*, or annual value of 250*l.* The qualification of electors of members of Council is possession of freehold worth 1,000*l.*, or annually 100*l.* Outside of municipal districts, but within such districts, freehold or leasehold property rated at 50*l.* a year is sufficient. Graduates of universities within the British dominions, barristers, and solicitors, legally qualified medical practitioners, officiating ministers of religion, certificated schoolmasters, and officers of the army and navy when not on active service, also have votes for the Legislative Council. The functions

of the Upper House differ very slightly from those of the House of Lords. Money bills may be either accepted or rejected, but they may not be altered.

An Act was passed in 1857 to abolish the property qualification required of members of the Legislative Assembly, and manhood suffrage exists so far as the election of that body is concerned. The duration of the Assembly is three years, and vote by ballot has been in operation since 1856.

EARLY HISTORY OF MELBOURNE.

Early history of Melbourne.

A generation has passed away since a small craft, aptly named "the Enterprise," was moored fast to some trees on the banks of the "Yarra," at the foot of a well grassed hill. The hill, called Pleasant Hill, has disappeared, but the 14 souls, which formed the living freight of that little craft, which arrived in August 1835, have increased into a people.

The site on which the capital of the colony (Melbourne) now stands was then a desert. In 1837 the town consisted of 36 huts, embowered in the forest foliage, and it had a population of about 100 souls. In 1838 the population had much increased, and the number of buildings was 300. In 1840, the population was 5,538 and the number of buildings 923.

It appears that on the spot selected for the city, excellent brick earth was discovered at the river side, and the neighbourhood yielded much fine and rough stone well suited to the builder. The progress of Melbourne from that date was extraordinary. Brick buildings took the place of wooden huts; the wooden inns were converted into handsome and convenient hotels, many shops, warehouses, and agencies were established, and branches of two Sydney banks commenced operations.

Population.

Melbourne is now the most populous city in Australia, having, with its suburbs, a population of 210,000, and rejoicing in all the luxuries of an European capital.

POPULATION of VICTORIA (formerly the district of Port Phillip), 1836–1872 :—

—	Males.	Females.	Total.
May 1836	142	35	177
September 1838	3,080	431	3,511
March 1841	8,274	3,464	11,738
„ 1846	20,184	12,695	32,878
April 1854	155,887	80,911	236,798
„ 1861	328,651	211,671	540,322
„ 1871	401,050	330,478	731,528
December 1872 (Estimated population.)	419,903	350,824	770,727

VICTORIA.

Population.

Whilst in England and Wales, there are about 389 persons on the average to the square mile, there are in Victoria about eight persons and in South Australia about three-fifths of a person to the square mile. The population is not of course of equal density throughout. The large towns and goldfields are, comparatively speaking, thickly peopled, whilst the agricultural districts are less so, and the pastoral districts still less so. Beyond those districts are large tracts of country which are not even yet fully explored.

Next to Melbourne, Ballarat is the most populous town in Victoria; it contains, with its suburbs, 47,201 inhabitants. Sandhurst and Geelong come next, with 28,577 and 21,459 inhabitants respectively.

From the first settlement of the colony to end of 1871, 1,019,553 persons are recorded as having arrived and 563,277 persons as having left the country. This leaves an excess of arrivals over departures equal to 456,276 souls.

Emigration.

Among the varied inducements held out to emigrants to Victoria has been the practice of granting aid to certain classes of persons by defraying either wholly or in part their cost of transit from Europe to the colony. The total number of immigrants assisted from 1838 to 1871 was 166,401, of whom 67,578 were males and 98,823 females; the female immigrants have been greatly in excess, as one of the objects of the Government in dispensing its bounty was to reduce the disproportion existing between the sexes.

During 1871, 378,634 acres of land were granted and sold. The land sales realised on an average 1*l.* 7*s.* 11*d.* per acre. Since the foundation of the colony over 1,000 acres have been granted without purchase, and over 8,000,000 acres have been sold. Putting the area of the colony at 56,446,720 acres, the extent unalienated at the end of 1871 was 48,329,035 acres.

Land.

The number of holdings, the extent of land in occupation, and that cultivated during the years ending 31st March 1863 and 31st March 1872, were as follows:

	Holding.	Area in Occupation.	Area enclosed.	Cultivated.
1863	16,416	4,722,050	3,353,200	465,430
1872	33,720	10,100,679	9,382,778	937,220

Crops.

The principal crops have been wheat, oats, barley, potatoes, hay, and green forage for cattle. In the year ending 31st March 1872, 335,000 acres, or an amount equal to nearly 36 per cent. of the land under cultivation, was devoted to wheat crop. Oats covered about 19 per cent., barley 2 per cent., potatoes 4 per cent., hay 11 per cent., and green forage 16 per cent.

In that year the quantities of the crops were as follows : VICTORIA.

Wheat. Bushels.	Oats. Bushels.	Barley. Bushels.	Potatoes. Tons.	Hay. Tons.
4,500,795	3,299,889	335,506	125,841	144,637

Besides these crops, a certain amount of attention has each year been paid to the cultivation of maize, rye, beans, mangolds, vegetable, &c., for all of which the soil and climate of Victoria are well adapted.

Considerable attention has also been devoted to the cultivation of tobacco, and in average seasons it has proved a remunerative crop. During the past year 299 acres were planted, from which 2,307 cwt. of tobacco was obtained, being an average of 8 cwt. to the acre. Tobacco.

The cultivation of the vine is steadily increasing. In *1863 there were 2,007 acres planted with vines.* During the past season no less than 5,523 acres of vineyards were under cultivation. From them, 137,687 cwt. of grapes were gathered, of which 106,791 cwt. were made into wine and brandy, and 30,896 cwt. were otherwise disposed of. The wine produce amounted to 713,589, and the brandy 1,579 gallons. It may be observed that Victorian wine is rapidly growing in favour. Vine.

Besides the vineyards, 9,828 acres were in 1871–2 cultivated as gardens, and 5,805 acres as orchards; 964 acres were placed under other crops, including artichokes, buckwheat, chicory, flax, hops, kohlrabi, melons, opium poppies, peppermint, sugar beet, strawberries, mulberries, olives, sunflowers, &c. &c.

The quantity of live stock in the colony of Victoria was as follows in the two years before-mentioned :

	Horses.	Cattle.	Sheep.	Pigs.
1863 -	86,067	576,501	6,764,851	52,991
1872 -	181,643	799,509	10,002,381	177,477

Live stock.

Estimating the population in 1872 at 770,729, there would be rather more than one head of cattle, about 13 sheep, about a fourth of a horse, and a fourth of a pig to every man, woman, and child in Victoria.

The approximate value of the manufacturing, mining, and agricultural machinery in operation in the colony, exclusive of any lands or buildings, is,—

	Value. £
Manufacturing machinery -	2,892,001
Mining - - -	2,060,885
Agricultural - -	6,452,201
Total -	£11,405,087

Machinery.

VICTORIA. Telegraph. To Victoria the credit is due of having laid the first line of telegraphic cable in the southern hemisphere. Nearly 3,500 miles of wire were opened by the end of 1871, and along this more than 537,000 messages were transmitted within the year.

Railways. Railways in the colony are, with the exception of the short lines which connect Melbourne with its suburbs on the south side of the River Yarra, the property of the State, and worked by Government officials.

The total length of the Government lines is 315 miles. A north-eastern line to Wodonga, on the River Murray, a distance of 125 miles, is now in course of construction, and a portion of it has already been opened for traffic.

Exports. The chief exports of the colony are gold, wool, and tallow. The net value of gold exported from the colony for each year from 1851 to 1871 inclusive is shown in the annexed table.

Gold. Gold exported from Victoria, 1851 to 1871 inclusive.

Year.	Weight. ozs.	Value. £
1851	145,137	438,777
1852	2,738,484	8,760,579
1853	3,150,021	11,090,643
1854	2,392,065	9,214,093
1855	2,793,065	11,070,270
1856	2,985,992	11,943,458
1857	2,762,461	10,987,591
1858	2,528,479	10,107,836
1859	2,280,950	9,122,037
1860	2,156,661	8,624,860
1861	1,967,420	7,869,758
1862	1,658,285	6,685,192
1863	1,627,066	6,520,957
1864	1,545,450	6,206,237
1865	1,543,802	6,190,317
1866	1,479,195	5,909,987
1867	1,433,687	5,738,993
1868	1,960,713	7,843,197
1869	1,700,973	6,804,179
1870	1,529,821	6,119,782
1871	1,647,389	6,590,952
	Oz. 42,027,116	£163,839,695

The gross exports of wool during the whole period from 1837 to 1871 amounted to 794,300,943 lbs., valued at 54,725,626*l.* The gross quantity of tallow has been 149,361,604 lbs., and its value 2,260,437*l.* Many other commodities peculiar to a pastoral and agricultural country —such as hides, leather, horns, hoofs, bones, &c.—are also exported from the colony in large quantities. VICTORIA. Wool.

Space does not admit of my quoting further statistics in regard to the trade of the colony; but a statistical summary from 1861 to 1871 inclusive is annexed, which will prove to the most casual reader the enormous progress which Victoria has made within the last 10 years, and the immense proportions to which her trade has grown. Progress.

STATISTICAL SUMMARY of VICTORIA from 1861 to 1871 inclusive.

Year.	Population.			Births.	Deaths.	Marriages.
	Males.	Females.	Persons.			
1861	321,724	220,076	541,800	23,461	10,522	4,434
1862	324,107	230,251	554,358	24,391	10,080	4,525
1863	327,249	244,310	571,559	23,906	9,502	4,227
1864	343,296	258,047	601,343	25,680	8,887	4,554
1865	350,871	270,224	621,095	25,915	10,461	4,497
1866	357,012	279,970	636,982	25,010	12,286	4,253
1867	362,273	289,298	651,571	25,608	11,733	4,490
1868	373,232	301,382	674,614	27,243	10,067	4,692
1869	385,561	314,229	699,790	26,040	10,630	4,785
1870	398,755	327,844	726,599	27,151	10,420	4,732
1871	416,906	348,334	765,240	27,382	9,918	4,693

Summary—*continued.*

Year.	Immigration.	Emigration.	Flour Mills.	Manufactories, Works, &c.	Land Sales.		Number of Acres under Cultivation.
					Number of Acres.	Amount realized.	
						£	
1861	26,912	35,898	104	429	514,745	623,588	439,895
1862	37,836	38,203	104	603	844,969	910,862	465,430
1863	38,983	34,800	110	716	295,180	450,646	507,798
1864	36,156	21,779	93	612	260,169	522,602	479,463
1865	30,976	25,292	118	785	139,776	295,456	530,196
1866	32,178	27,629	114	872	221,582	380,240	592,915
1867	27,242	25,142	118	990	129,333	214,077	631,207
1868	32,805	25,552	136	1,182	275,649	359,703	712,865
1869	33,570	22,418	149	1,385	725,110	794,543	827,534
1870	32,554	21,087	147	1,437	337,507	463,821	909,015
1871	28,333	19,951	154	1,909	378,516	528,119	937,220

VICTORIA.

STATISTICAL SUMMARY of VICTORIA from 1861 to 1871 *inclusive —continued.*

Progress.

Year.	Live Stock.				Shipping.			
					Inwards.		Outwards.	
	Horses.	Horned Cattle.	Sheep.	Pigs.	Number of Vessels.	Tonnage.	Number of Vessels.	Tonnage.
1861	84,057	628,092	6,239,258	43,480	1,778	549,195	1,820	540,807
1862	86,067	576,601	6,764,851	52,991	1,715	556,188	1,766	581,892
1863	103,328	675,272	7,115,943	79,655	1,739	624,061	1,782	618,052
1864	117,182	640,625	8,406,234	113,530	1,816	620,200	1,896	641,614
1865	121,051	621,337	8,835,380	75,869	1,743	580,973	1,823	599,351
1866	121,381	598,968	8,833,139	74,708	2,078	649,979	2,203	675,741
1867	131,148	650,592	9,532,811	141,522	1,847	593,235	1,955	617,026
1868	143,934	693,682	9,756,819	136,206	2,067	653,362	2,172	685,207
1869	161,830	692,518	9,923,663	111,464	2,320	721,274	2,334	730,961
1870	167,220	721,096	10,761,887	130,946	2,093	663,764	2,187	681,098
1871	181,643	799,509	10,002,381	177,477	—	—	—	—

Summary—*continued.*

EXPORTS OF COLONIAL PRODUCE.

Year.	Gold.		Wool.		Tallow.		Hides and Skins. (Value.)
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	ozs.	£	lbs.	£	lbs.	£	£
1861	1,967,420	7,869,758	23,923,195	2,095,264	4,208,960	75,784	100,624
1862	1,658,285	6,685,192	25,245,778	2,350,956	3,998,904	66,515	130,661
1863	1,627,066	6,520,957	25,579,886	2,049,491	1,938,708	33,871	106,890
1864	1,545,450	6,206,237	39,871,892	3,250,128	3,882,256	60,230	103,625
1865	1,543,802	6,190,317	44,270,666	3,315,109	1,396,640	15,566	83,962
1866	1,479,195	5,909,987	42,391,234	3,196,491	320,432	6,599	55,800
1867	1,433,687	5,738,993	51,314,116	3,824,956	2,103,360	34,968	31,458
1868	1,960,713	7,843,197	68,010,591	4,567,182	12,104,960	160,909	33,619
1869	1,700,973	6,804,179	54,431,867	3,363,075	14,259,616	237,084	60,461
1870	1,529,821	6,119,782	52,123,451	3,205,106	22,158,080	358,863	33,649
1871	1,318,207	—	72,273,234	4,483,461	29,992,928	464,113	—

Summary—*continued.*

Year.	Imports. (Total Value.)	Exports. (Total Value.)	Revenue for the Service of each Year.	Expenditure for the Service of each Year.	Schools.		No. of Churches, Chapels, &c.	Convictions.
					Number of Schools.	Scholars.		
	£	£	£	£				
1861	13,532,452	13,828,606	2,952,101	3,092,021	882	56,473	989	846
1862	13,487,787	13,039,422	3,269,079	3,039,497	989	65,541	1,137	769
1863	14,118,727	13,566,296	2,774,686	2,882,937	1,019	69,619	1,352	684
1864	14,974,815	13,898,384	2,955,338	2,928,903	947	66,145	1,531	567
1865	13,257,537	13,150,748	3,076,885	2,983,777	1,080	73,599	1,695	675
1866	14,771,711	12,889,546	3,079,160	3,222,025	1,206	81,229	1,766	639
1867	11,674,080	12,724,427	3,216,317	3,241,818	1,385	91,336	1,874	566
1868	13,320,662	15,593,990	3,230,754	3,189,321	1,430	97,884	1,870	526
1869	13,908,990	13,464,354	3,383,984	3,226,165	1,722	151,844	1,967	486
1870	12,455,758	12,470,014	3,261,883	3,428,382	1,867	154,353	2,184	573
1871	12,341,995	14,557,820	—	—	2,051	165,276	—	—

Very recent information enables me to supplement this remarkable table by further statements reaching to 31st March 1873, respecting the chief articles of export produce.

Thus the crops for the years 1872–3 were as follows:—

Wheat. Bushels.	Oats. Bushels.	Potatoes. Tons.
5,391,104	24,542	132,996

Wool produce of Victoria exported during the same period, 53,237,195 lbs., valued at 4,260,801*l.*; and the live stock had still further increased to—

Horses.	Sheep.	Pigs.
185,796	10,575,219	193,782

Full information as to wages, prices of provisions, and other points on which intending settlers may be desirous of obtaining accurate knowledge, are always to be obtained by application to the admirable agency established by the Government of Victoria in this country.

The object of this paper is simply to enable the reader to form a general idea of the colony, its progress and prospects, and the merits and peculiarities of the produce exhibited at the Vienna Exhibition. That which has already been stated, and which is compiled chiefly from the valuable statistics prepared by Mr. W. H. Archer, Registrar-General of Victoria, will be sufficient to show the rapid and wonderful development of that colony.

By the help of the official record issued in Melbourne in 1873, I shall now proceed to summarise a short account of

VICTORIA. the principal articles of produce exhibited by the colony at the late Exhibition in Vienna. A catalogue of the exhibits will be found in the Appendix.

Exhibits.

EXHIBITS AND EXHIBITIONS

The number of exhibits sent from the colony of Victoria were 441, and 49 exhibitors either received medals or honourable mention, a result which cannot but be satisfactory to the colony at large.

Fine Arts.

FINE ARTS.

In the first division, Fine Arts, there were 31 exhibits, 17 of which were photographic views of different parts of the colony. There is no better or more desirable means of showing the extent and importance of cities and districts in any foreign country than by the medium of photography; and many of the photographs sent, more particularly those of Mr. Bardwell, Messrs. Harvey and Dimden, the Commissioners of the Melbourne Intercolonial Exhibition, and of the Lands Department, were really very fine specimens of the art of landscape photography.

Manufactures.

MANUFACTURES.

Division II. is dedicated to Manufactures, the first section of this division being occupied by woollen tweeds and shawls manufactured at Geelong. The wool trade in Victoria is, so far as actual money value is concerned, second in importance to the gold mining interest; but as a safe and permanent occupation it must be conceded that that of the wool grower is preferable to that of the miner. Many fortunes have doubtless been made out of the alluvial deposits and the auriferous reefs which abound in the colony; but on the other hand many a man who has embarked his capital in that venture has not come off scathless. As regards wool growing, there is little or no speculation. Success in that occupation is the rule, and not the exception, as in mining. Considerable attention has been paid in the colony to the improvement of the stock, and the result is that the sheep and wool of Victoria and the Riverina district are superior at the present time to what they have ever been before. Foreign blood has constantly been introduced, and of late the Lincoln and other sheep of long-woolled breeds have at very great cost been imported into the colony. It is considered debateable, however, whether these later importations will permanently interfere with the claim of the merinoes to be regarded as the best sheep for Australian pastures.* 73,270,000 lbs.

* On this point, see article on New Zealand, wool, p. 202.—W. R.

weight of wool were exported in 1871, being the largest amount within the last 10 years. It must, therefore, be admitted, seeing that the staple has improved in quantity as well as in quality, that the condition of the wool trade is most satisfactory, and that its prospects are not likely to be less satisfactory than they are at present.

Within the last few years a great improvement has taken place in the manufacture of woollen tweeds and shawls.

The steel manufactures exhibited at Vienna were not of sufficient number or importance to deserve much notice on account of their individual merits; but it may be observed that steel and iron manufactures are growing in importance in the colony, and that already there are in Melbourne, Ballarat, and other towns, numerous iron foundries at work, which can supply engines for the flour mills and other manufactories in Victoria, iron girders for the use of the State railways, machinery for mining, as well as agricultural implements, which are quite equal in finish and in lightness to anything that can be produced in England.

GRAIN, CEREALS, AND PULSE.

Grain, &c.

The crop of wheat raised in Victoria for the year ending 1872–3 was 5,391,104 bushels. There were only three samples exhibited at Vienna, and these did not appear to be nearly so heavy in weight as the wheat sent from a neighbouring colony, one specimen of which weighed 69 lbs. to the bushel. It has been stated that within the last few years the yield of wheat per acre has been gradually decreasing, and that the land in some districts has been exhausted by sowing it year after year with grain, allowing neither manure nor rest. It is, of course, quite impossible in such circumstances that an average yield can be maintained, and it is to be hoped that such a short-sighted policy will be abandoned.

FRESH FRUIT.

Fruit, roots, and seeds.

The Horticultural Society of Victoria satisfactorily proved that for the future there need be no difficulty in sending fresh fruit from one side of the world to the other. It was decided to send freshly picked apples to the Vienna Exhibition. After having been carefully picked so as to avoid bruising, each apple was wrapped in clean tissue paper and placed in layers between dry cotton wool. The cases which contained these specimens were placed in the ice rooms of the Peninsular and Oriental steamer by which they were sent, and when unpacked and placed in the show cases they were, with one or two exceptions, in excellent condition.

Victoria.

This result cannot fail to be satisfactory to Mr. Carson, who arranged for their transmission to the Exhibition.

The roots, fruits, and seeds sent to Vienna formed a very interesting collection. The drying and preservation of fruits, of which all sorts grow well in the colony, is an industry to which attention might be at once turned with advantage. Whilst fac-similes of oranges, plums, lemons, and cherries were sent, there were no specimens of the olive, to the culture of which especial attention has been directed in Victoria. From the official record of the International Exhibition in Melbourne of 1872–3, it appears that the olive tree grows in Victoria and many other parts of extra-tropical Australia, with a luxuriance rarely attained in Europe, and bears fruit abundantly and with little or no care. Considerable quantities are now grown in the neighbourhood of Melbourne; but owing to there being no sufficient means available for pressing the olives, they are in most cases allowed to fall to the ground, or else are used for fattening fowls.

Chemicals.

Chemicals.

There are already no less than six chemical works in Victoria, in which most of the drugs (similar to those made in England) are produced from Australian vegetation, whether for pharmaceutical, scientific, or more general purposes. A glance at the Catalogue in the Appendix will show the uses to which these drugs are applied. The exhibits of Mr. Bosisto were of great interest, and well worthy of the study of the medical faculty.

Groceries.

Groceries.

The chief exhibit in this class was Victorian beetroot sugar, a good marketable article, and one the growth and manufacture of which seems very likely to increase. This exhibit received the medal for merit.

Preserved Meats.

Preparations of Food.

In this class the preserved meats undoubtedly attracted most attention, not only of the ordinary visitors to the Exhibition, but of the directors of other courts, more particularly of the French court. I had myself many applications for sample tins, and I had much pleasure in furnishing the French Commissioner with all the information I could obtain on the subject.

Looking to the very inferior quality of the meat all through Germany, it would appear that there is a good opening for the introduction into that country of enormous quantities of Australian preserved meat. There is, however, still one

fault which must be overcome before the meat can ever become a regular article of diet in Europe, and that is, overcooking, which renders the meat apparently less nutritious, and certainly less palatable, than it otherwise would be, or than ordinary fresh meat. There is no industry which has made such rapid progress as that of preserving fresh meat; but the export this year has been much less than that of last. The varieties shown at Vienna were such as to satisfy the most epicurean taste; besides the ordinary mutton, beef, and soups, there were roast goose, roast duck, rabbits, kangaroo tails, calves' head and bacon, several kinds of game, and kidney soup.*

There is, however, a prejudice against preserved meat in this country, which can only arise from its novelty and from the fact of its being overcooked. With meat at famine prices in England and on the continent, it is to be hoped that a better method of preserving Australian meat will be discovered, or that the attempt to introduce frozen meat, which has been once essayed, will ultimately prove successful.

Frozen meat.

There was every reason to expect that the cargo recently shipped by Mr. Harrison would arrive in good condition; but for the present we have been disappointed. The process by which the meat is frozen and kept in that condition has already on more than one occasion been made known to the public. Ice mixed with salt is placed upon the top of the tanks containing the meat, and the cold brine trickles down the sides of the tanks and freezes their contents. But owing to some defect, attributed to haste in the construction of the apparatus, an excessive leakage of the freezing brine took place, and the ice consequently melted with undue rapidity, and was not sufficient to hold out during the voyage. When the "Norfolk," the ship in which the meat was consigned, had been 34 days at sea, it was found necessary to throw overboard the greater part of the meat. Only one ton was brought safely as far as the Azores, where, owing to the total failure of ice, it also had to be thrown overboard. This disappointment, scarcely less severe to the public than those commercially interested in the adventure, will, I trust, not deter Australian capitalists from making a further attempt to do at sea what they have already proved can be done on land.

Two medals for progress and two for merit were awarded in the case of those exhibits at Vienna.

* The largest and most varied collection of meats shown in the Colonial Court was that sent by Mr. D. Tallerman.

VICTORIA.

WINE AND SPIRITS.

Wines and spirits.

The exhibits in Section V. were perhaps the most important specimens of new industry which were shown by the colony.

From 2,000 acres under crop in 1863 the cultivation of the vine has now covered 5,500 acres, containing 9,691,292 vines, and there is every reason to believe that Victoria and one or two other of the Australian colonies will hereafter be enormous exporters of wines, as well as wine-producing countries.

The taste for colonial wine is on the increase. The statistics of cultivation prove that the planting of vineyards is a popular industry, and that the prejudices which hindered the extension of that cultivation in former years have been dissipated. The opinions of competent judges expressed at various exhibitions of wines of Victorian growth have been almost invariably favourable. At the International Exhibition of 1866–7, and more recently at the exhibition held in Melbourne, a critical examination was made of their qualities, and the highest testimonials were awarded them for purity, flavour, and body.

At a meeting of the Medical Society of Victoria some years ago, it was unanimously recommended that colonial wine should be administered in hospitals and asylums in place of imported ports and sherries, that had hitherto been used, and the wine specially noticed for this purpose was at that time a wine grown at Albury, in the Murray River district of New South Wales. The immense progress of wine production in Victoria has enabled that colony to be in a large measure independent of the supply from the elder colony, and the consumption of its own wines is still rapidly increasing. There is no doubt that this demand, both at home and abroad, will be stimulated by the recent exhibitions, and will encourage the wine-growers in the colony to place before the public a wholesome as well as an invigorating beverage.

When one considers the hitherto large consumption of spirits and fortified wines in Victoria and the other Australasian colonies, and calculates the vast sums of money which have been annually expended on them, and the injurious results which necessarily accrue to the intemperate consumer, the desirability of spreading a taste for their own pure and wholesome products becomes most evident. The only reason that these wines are not in larger demand must proceed

from the ignorance of their quality on the part of the public. It is to be hoped, and indeed it is certain, that increased attention will be paid to this valuable industry, and that before long the products of the Australian vineyards will form an important item in the exports from that continent.

The most careful selection made by wine experts in Victoria was sent to the Vienna Exhibition, and samples of Grenache, Hermitage, Sauvignon, Riesling, Muscatel, Shiraz, and Verdielho wines either gained medals or honourable mention.

The diploma of honour, the highest recognition that could be awarded, was exclusively granted to the colony for its wines; but as a rule had been laid down in the wine section that no diploma of this class should be granted to any individual or society trading for profit, and further that none could be conferred on any city, province, or even on any official representative, the name of the Acclimatization Society of Victoria was inserted on the diploma as being the public body most likely to have been instrumental in promoting the importation and cultivation of vines from Europe.

In 1872 1,579 gallons of brandy were also manufactured in the colony.

Division III.

Scientific inventions and new discoveries do not call for any remark so far as they were represented at Vienna.

Division IV.

Raw Produce.—Victoria naturally affords many facilities to the tanner and furrier. Its bullock hides are of the best quality, and it is rich in valuable tanning bark, of which large quantities are exported to Europe. From the report of the sectional committee at Melbourne, it appears that sheepskins are an important article of commerce, and that large quantities are dried and exported to Europe in the form of "basils," and are there employed in numerous branches of leather manufacture. It is stated that the Victorian roans and enamelled and japanned leather are as good as could be desired. Goats and kids skins are worked up to a limited extent, the former sometimes with the hair on for mats, rugs, and the like. Kangaroo skins are becoming an important article of traffic, and experts declare that they make the toughest and most pliable leather in the world. Boot uppers of this material are most comfortable and durable. It also makes the best of morocco whips, gloves, &c. Of these skins

Raw produce.

VICTORIA. some are exported in their raw state and others after being manufactured. Great numbers of kangaroos are slaughtered every year for their skins alone, and the hunters make good wages. As they increase so fast when unmolested as to interfere with the profits of the grazier, their wholesale destruction is frequently encouraged, and is not a matter for regret.

Rabbit skins are also exported in large quantities, and the animals have increased to such an extent since their introduction into Victoria, that men have been employed to destroy them. The rapid growth of this comparatively trivial industry illustrates the commercial activity of the colony. When first they were an article of trade, their value was *6d.* a dozen, whereas they are now worth *2s.* in Melbourne, and sell in London at *3s. 6d.* a dozen. For the year ending 31st March 1873 the export was 100,000 dozen.

To wool I have already referred.

Woods.

WOOD.

Of Victorian timbers the Eucalyptus rostrata, or red gum, is said to be most valuable. It is a hard dense wood, with a handsome curly grain, and is almost indestructible in damp ground, or in water, either salt or fresh; its failings are stated to be a short grain, which make it unsafe for horizontal bearing timbers in any but very short lengths. Red gum posts, although rough, will last twice as long as those of other woods, and for spokes and felloes of heavy wheels it is much esteemed by wheelwrights.

Next to the red gum is the Eucalyptus globulus, or blue gum (a tree of remarkably rapid growth), and the Eucalyptus mellisdora, or box. The wood of these trees is of great strength and tenacity, and is to be procured in any lengths.

Some extraordinary properties have been recently attributed to the blue gum tree, for the accuracy of which I am of course unable to vouch, but from the "Medical Times and Gazette" of the first week in November, it appears that M. Gimbert, who has been long engaged in collecting evidence concerning the Australian tree, "Eucalyptus globulus," the growth of which is surprisingly rapid, attaining besides gigantic dimensions, has addressed an interesting communication to the Academy of Sciences. This plant, he asserts, possesses an extraordinary power of destroying miasmatic influence in fever-stricken districts. "It has the singular "property of absorbing ten times its weight of water from "the soil, and of emitting antiseptic camphorous effluvia. "When sown in marshy ground it will dry it up in a very

"short time. The English were the first to try it at the "Cape, and within two or three years they completely "changed the climatic condition of the unhealthy parts of the "colony. A few years later its plantation was undertaken on "a large scale in various parts of Algeria. At Pardock, 20 "miles from Algiers, a farm situated on the banks of the "Hamyze was noted for its extremely pestilential air. In the "spring of 1867 about 13,000 of the Eucalyptus were planted "there. In July of the same year—the time when the fever "season used to set in—not a single case occurred; yet the "trees were not more than nine feet high. Since then complete "immunity from fever has been maintained. In the neigh-"bourhood of Constantine the farm of Ben Machydlin was "equally in bad repute. It was covered with marshes both "in winter and summer. In five years the whole ground was "dried up by 14,000 of these trees, and farmers and children "enjoy excellent health. At the factory of the Gue de Con-"stantine, in three years a plantation of Eucalyptus has trans-"formed 12 acres of marshy soil into a magnificent park, "whence fever has completely disappeared. In the island of "Cuba this and all other paludal diseases are fast disappearing "from all the unhealthy districts where this tree has been "introduced. A station-house at one of the ends of a railway "viaduct in the Department of the Var was so pestilential "that the officials could not be kept there longer than a year. "Forty of these trees were planted, and it is now as healthy "as any other place on the line."

The bloodwood is another variety of the Eucalyptus, and is highly esteemed.

The wattle is esteemed for the value of its bark as a tanning agent. The use of this wood is almost universally confined to the manufacture of staves for casks, and large quantities are used as firewood.

The iron bark is one of the heaviest and hardest woods of Victoria; but it does not grow to any size. It is, however, very strong and tenacious, and is much used by wheel-wrights.

The above were the principal woods shown at Vienna.

The importation of timber into Victoria is a most important branch of trade. It appears that during the year ending 30th June 1872, timber to the value of 300,000*l.* was imported. Although heavy prohibitive duties are imposed, the colony is, owing to the absence of indigenous timber, fitted for the use of the builder and carpenter, obliged to continue this large importation.

VICTORIA.

ORES AND COAL.—SECTION 4.

Coal, tin, antimony, gold, &c.

The richness of Victoria in precious metals is now historical; but although every one is aware that the colony is teeming with auriferous reefs, and gold has formed the chief attraction to the miner, the ores of silver, iron, tin, copper, lead, and antimony are also plentifully distributed, the latter having been found a few miles from Melbourne.

Many varieties of iron ore are found in the colony, viz., magnetite, magnetic oxide of iron crystallized, and brown hematite, which yield by analysis 70 per cent. of metal, whereas the iron ores usually worked in Great Britain and abroad produce only from 30 to 50 per cent. of metal.

Tin.—Stream tin is found in various creeks in the colony and in parts of Gippsland. It is probable that the recent discoveries of rich deposits of this metal in Queensland and New South Wales will stimulate to more active prospecting in Victoria for tin. During 1871, 250 tons of ore and 17,808 lbs. of tin were exported.

Antimony.—This ore is chiefly found at Heathcote, but it also exists at Whroo, from which place a sample shown at Vienna came, and in various other parts of the colony. 1,575 tons of antimony ore were raised in 1871. There were not more than 200 miners employed in mining for metals and minerals other than gold on the 31st December 1871.

Coal.—Notwithstanding that the coal formations of Victoria occupy an estimated area of 3,200 square miles, the colony is still dependent on New South Wales for its supply. A glance at the Colonial Office List,* page 87 (edition of 1873), will show that in 1867 Victoria received 145,883 tons of coal, of the value of 69,220*l.*, from New South Wales, and that in 1871 the import had increased to 193,370 tons. At the London Exhibition of 1862, coal from Cape Patterson was shown, and samples from the same place were exhibited at Melbourne and Vienna. Preparations are being made for laying a tram from the pits to Griffith's Point, the place of shipment, and the company hopes (notwithstanding recent discouraging surveys) shortly to be able to send coals to Melbourne at a cost of 1*l.* a ton.

Looking to the enormous quantity of coal raised in Great Britain annually, and the fact that the price is about 1*l.* 15*s.* per ton. with no present prospect of reduction, the question of the possible production of coal in the colonies, or indeed in any place to which we export coal, is a question of immense public interest. It is gratifying to learn that

* Colonial Office List by W. Robinson, published by Harrison and Sons.

the search for coal is being carried on with increasing energy, that 17 searching licenses were granted in 1871, and that discoveries were reported to have been made in the neighbourhood of Western Point. VICTORIA.

Gold.—The mines of the colony are placed under a mining department, the head of which has a seat in the Legislative Assembly and in the Cabinet. Gold.

Long before the discovery of gold was publicly announced in Victoria, pieces of the metal had been found by shepherds and others, and numerous anecdotes are related by old settlers of credit respecting these early discoveries. In March 1850, gold is said to have been found at Clunes; on the 10th June 1851, it was found near Burn Bank, on a tributary of the river Loddon; on the 20th July, at Mount Alexander; on the 8th August, at Buninyong; and on the 8th September, in the same year, at Ballarat. The conflicting claims of discoverers render it very difficult to fix the dates with any degree of accuracy, and it is certain that gold had been found and recognised as such long before public attention was directed to the fact of its existence in Victoria. Indeed, there is reason to believe that the statements of settlers who returned to Europe in the early days of the colony left no room for doubt in the minds of scientific men at home that Victoria was a gold-producing country. Licenses to dig were first issued on the 1st September 1851, and such great yields were reported that the colonists very soon left their ordinary occupations for the exciting work of searching for gold. In 1851 the total male population of the colony was only 46,202, and the sudden withdrawal from their usual pursuits of nearly the half of these, produced a change in the social condition of the country which eye-witnesses describe as the most wonderful revolution which the world probably has ever witnessed. Lawyers forsook the courts, merchants their counting-houses, clerks their desks, and artisans and labourers fled precipitately from houses but half built, and foundations but partly dug. Even clergymen were drawn to the exciting scene, and not in every case did they confine themselves to their calling. The price of labour increased enormously; provisions of all kinds rose to unprecedented prices; property in Melbourne was seriously depreciated; and it was only after the great and sudden influx of immigrants from Europe and the neighbouring colonies, that society regained, in some measure, its normal state. Early discovery.

In the condition of the mining population alone there has been a marked alteration. In 1851, 1852, and 1853 the great centres of mining industry were covered by calico tents. Condition of mining population.

VICTORIA. Condition of mining population.

A few huts made of the bark of the Eucalyptus tree were seen here and there, but the great mass of the population were sheltered by calico and canvas only. The Government officers lived in tents, and the banks transacted their business in little canvas houses, in which the bank manager of the present day would scarcely wish to trust his horse. At the present time we see large inland towns on the sites of these old camps. Beautiful and solid structures of stone and brick have replaced the calico tents, and miles of streets are paved and channelled. Excellent public buildings have been erected for religion, business, and amusement; and at night one sees by the light of gas busy marts, where only a few years ago the ground was entirely in the possession of the miner. This change in itself is startling enough, but it involves other questions almost neglected by those who speak of the decreasing yield of our gold fields. In the early days nearly every man was a miner. The storekeeper had a "claim," the hotel keeper worked at least a portion of every day, and the miner himself worked hard and energetically from sunrise to sundown. This he was obliged to do; for if he ceased to mine he ceased to earn his daily bread. Now, a large part of the population of each gold field is engaged in ministering to the wants of the miner. There is no longer the same excitement, and there is no longer that steady perseverance and restless activity which distinguished the mining population in the old times. If gold-seeking is disappointing, the miner turns to some other pursuit, and numbers of pursuits are open to him. In the vicinity of every large gold field immense tracts of country are fenced in and cultivated, and thus agriculture, horticulture, and trade are continually absorbing the labour which at one time was confined exclusively to the searching for gold. A comparison of the tables of machinery used by the miners in the several years, from the commencement of the gold workings, tells only imperfectly the change which has come over the gold fields. If the fact that, in 1856, the value of the whole of the machinery was less than 200,000*l.*, and that it is now 2,060,885*l.*, speaks of progression, how much more does the actual improvements of those large inland towns bespeak the rapid advancement of the colony. While at one time the whole of the buildings of a town might be reckoned in hundreds of pounds, it must now be reckoned in millions, for millions have been spent in building houses and stores, in forming streets and roads, and the like improvements in such places as Ballarat, Castlemaine, and Sandhurst.

In the early days of the gold fields the miner explored only the surface of the vein or reef, where gold was quite

Mining.

apparent without the aid of the lens. The quartz was broken into fragments and pounded with a hand hammer, and the gold either washed out or amalgamated with mercury, and yet so rich was the matrix that many miners earned thus from 6*l.* to 10*l.* per week. The tailings (*i.e.* the refuse pounded quartz) have since been passed through amalgamators with considerable profit, and some machines have been erected for the sole purpose of extracting gold by amalgamation from the tailings left by the miners who first experimented on the quartz veins. It was soon discovered that it was a profitable occupation to pursue the course of the veins of quartz; expensive shafts were sunk to a considerable depth; and at the present time the principal portion of the total quantity of gold obtained in the colony is yielded by these veins.

Quartz veins are found in nearly every part of the colony where the schist rocks appear at the surface, and the plans furnished by the mining surveyors exhibit them running generally nearly north and south, in close proximity, on all the principal gold fields. The veins vary in thickness from half an inch to 20 or even 50 feet.

Many of the reefs are of surprising richness, and yields of 266 oz. to the ton have been reported. There is practically no limit to profitable quartz mining in Victoria.*

Depth of mines.

Some years ago the theory was advanced that loss would follow any attempts to mine for gold at great depths; but they have been entirely dispelled by the results which have been obtained from deep sinking at Sandhurst and other gold fields. For instance, at Pleasant Creek, at a depth of 800 feet, 17 tons of quartz yielded 2 oz. 8 dwts. 16 grains of gold. At the Cross Flat reef the deep shaft is more than 1,225 feet beneath the surface, and is being sunk still deeper.

The fact that extremely rich quartz is raised in the colony every day from depths considerably below the level of the sea is of great importance in regard to the material interests of the colony and of much scientific interest.

The rent payable under gold mining leases is at the rate of 1*l.* per acre per annum.

Numbers of miners.

The latest reports to 30th June 1873 show that the mining industry is in a very prosperous state, and that the total yield of gold for the quarter ending on that day was 283,248 oz. There were 35,806 alluvial miners, and these

* I believe I am correct in stating that machinery has been brought to such perfection, and is comparatively so cheap, that a yield of 5 dwts. per ton pays at the present time.

VICTORIA. obtained 123,643 oz.; but the 17,079 quartz miners obtained 159,605 oz.

The number of miners at work during that quarter was 52,885, of whom 14,145 were Chinese.

The total revenue directly derived from the gold fields between 1851 and 1871 has been 5,327,509*l.*

Copper. *Copper.*—No copper or copper ore the produce of Victoria was exported during the six months ending 30th June 1872.

Samples of native metallic copper have been obtained from the silurian clay shales at Egerton. It occurs in thin strings lying between the joints and divisions of the rocks.

Numerous samples of carbonate of copper have been found in various localities in Gipps Land. Samples from Egerton of native copper, and from Gipps Land of carbonate of copper, were exhibited at Vienna.

There are 964 acres of land now held under copper mining leases, and 640 acres under license for the purpose of searching for copper.

Lead. *Lead.*—During the six months ending 30th June 1872, 6 tons 5 cwt. of lead were exported. There are at present two mining leases and nine searching leases in force.

Fine samples of Argentiferous galina have been found in the eastern part of Gipps Land, where several miners are now engaged in opening up veins.

Besides the above minerals, specimens of silver, zinc, cobalt, manganese, molybdenite, lignite, slates, and magnesite were exhibited at Vienna, testifying to the various and wonderful mineral resources of Victoria.

Aborigines.

ABORIGINES.

The last section in the catalogue of articles exhibited at Vienna relates to the aboriginal inhabitants of the colony. When Port Phillip was first settled, it was believed that their number amounted to about 5,000. When Port Phillip was separated from New South Wales in 1851, their number was stated to be 2,693. An attempt to take an account of their number at the census of 1871 was made, and it was supposed to be about 1,330, viz., 784 males and 546 females. Although they decreased rapidly in the early days of the colony, it is stated that they are not now diminishing to any serious extent. Parliament votes an annual sum expressly for the aborigines, and those who are in want can always obtain food and clothing, and those who are sick are provided with medical attendance.

CONCLUSION.

From these few remarks it will be seen that in 37 years the population of Victoria has increased from 177 to 770,729

souls, the revenue to three millions and a quarter sterling per annum, the exports to the value of 14,550,000*l.* a year. Trade is flourishing and agriculture is extending. The colony is still, however, in want of good workmen, and employers find it difficult to obtain as much skilled labour as they require. As that demand is supplied the colony must attain to greater wealth and even more boundless prosperity than it has already reached in so short a space of time. VICTORIA.

WEST AFRICA SETTLEMENTS.

WEST AFRICA SETTLEMENTS.

The British settlements on the west coast of Africa are the nearest to Europe of any of Her Majesty's tropical possessions. Of the gold producing countries of the world they are also nearest to Europe, and they afford great facilities for the collection and speedy transit to England of raw materials essential to our manufactures.

The total imports and exports from and to the west coast of Africa in 1872 were— Commercial movement.

Imports.	Exports.
1,161,380*l.*	1,315,989*l.*

It will therefore be seen that their total commercial movement exceeded in annual value at the date of the latest returns the sum of 2,477,000*l.*

The object which Great Britain had in assuming the responsibility of governing these settlements and of maintaining them was the suppression of the slave trade and the encouragement of British commerce. Slave trade.

As regards the slave trade it is a well-established fact that it has disappeared from the neighbourhood of every spot on the west coast which has been made a British settlement.

As regards commerce it may be observed that if the trade of the west coast is compared with that of any of our largest colonies, it is not of much moment, but it probably owes its continuance and its increasing importance to the encouragement and support which the British Government affords it. Commerce.

It of course can be readily understood that the extent of a trade which is carried on principally through native agency and through various tribes must depend very much upon the relations, peaceful or otherwise, which those tribes have with each other.

The reasons for which the settlements are now maintained

WEST AFRICA SETTLEMENTS.

seeing that the exportation of slaves has been abolished, is therefore avowedly the protection and encouragement of commerce, and the introduction of such civilizing influences amongst the tribes of the interior as will lead them to abolish and modify their savage customs and barbarous practices.

A brief account of the geographical position of the settlements will show how they are situated for commercial purposes.

SIERRA LEONE

Is the most important of the British possessions on the west coast.

Geographical position of Sierra Leone.

It consists of a peninsula on which is situated Freetown, which was settled towards the close of the last century. From 1819 to 1824 portions of land on the Bullom shore, on the opposite side of the river, and a tract of country along the Rokel River, were also obtained from the natives, but these cessions have never been turned to any practical account. The Isles de Los, which lie 70 miles to the north of the peninsula, are also British territory, but have not been occupied of late years. The colony is 18 miles long by 12 broad, and has an area of 300 square miles. It was ceded to Great Britain in 1787 by the native chiefs. Four years afterwards a charter was granted to a company under the name of "the Sierra Leone Company." In 1800 a grant was made to the company by letters patent of the peninsula, and a court of directors of the company was empowered to appoint a governor and council, the former having power to enact laws; this state of things lasted seven years, when the colony was transferred back to the Crown. The cession of Sherbro' Island and a portion of the mainland opposite was accepted in 1861, at the desire of the inhabitants, who were anxious for the security which British protection would afford them.

There is no protectorate, nor anything analogous thereto, exercised over any part of the country. The government of Sierra Leone is administered by a governor, with executive and legislative councils.

The Gambia.

THE GAMBIA.

The Gambia is a great river of Western Africa; it falls into the Atlantic Ocean by a large estuary measuring in some parts nearly 27 miles across, but contracts to 10 miles between Bird Island and Cape St. Mary, and to little more than two between Barra Point and the town of Bathurst on St. Mary's Island. The advantages of this noble river for carrying on trade with the natives in the interior of Africa

WEST AFRICA SETTLEMENTS.

were well known to our merchants upwards of 230 years ago.

In 1588 a patent was granted by Queen Elizabeth to some merchants of Exeter to trade in this river, and in 1618 a company was formed in this country for that purpose. The company was not successful, and another established two years later experienced a like want of success.

In 1724, and subsequently till its abolition, it appears that the trade in slaves formed the staple traffic of the company. The general commerce between Great Britain and the Gambia fell off after the abolition of the slave trade till 1816, in which year a new settlement was formed at the island of St. Mary. The distance of the principal districts and British settlements, according to a report furnished to Government by Dr. Madden, who had been employed as a commissioner to investigate the western coast of Africa in 1841, is as follows:

SETTLEMENTS.

	Miles.
From Sierra Leone to the Gambia -	- 500
„ Senegal to the Gambia -	- 180
„ St. Mary's to St. James' Island	17
„ St. James' to Elephant Island -	80
„ Elephant to Deer Island -	45
	— 142
„ St. Mary's to Barraconda Falls	- 300
„ Barraconda to Fort St. Joseph	- 150

The governor of the Gambia exercises no authority over the population surrounding the British settlements. Bathurst is a trading port of a navigable river, affording a convenient means of intercourse with the interior of Africa to a distance of several hundred miles.

The settlement was at first subject to the government of Sierra Leone, but in 1843 it was created an independent colony, with a govenor and executive and legislative councils for the administration of its affairs. In consequence of the deliberations of a committee appointed in the summer of 1865 to inquire into affairs on the western coast of Africa, the Gambia and the Gold Coast were again placed under the government of Sierra Leone.

GOLD COAST.

The Gold Coast.

Gold Coast is the name generally given to a portion of Upper Guinea between 5° and 4° 20′ E. longitude, stretching along the Gulf of Guinea from the river Assini on the west

WEST AFRICA SETTLEMENTS.

Gold Coast.

to the River Volta on the east, between which points are the settlements of Appollonia, Axim, Dix Cove, Elmina, Cape Coast Castle, Anamaboe, Pram Pram, Accra, Christiansborg, and Fredericksborg. In 1750 the African Company was constituted by Act of Parliament, with liberty to trade and to form establishments on the west coast of Africa between 20° N. and 20° S. lat.; from the year 1750 to 1807 the parliamentary grant for the forts and settlements on this coast averaged 13,500*l.* per annum, and was augmented in 1807 to 23,000*l.* per annum, In 1821 the forts and settlements which had been previously vested in the African Company, were transferred to the Crown, and on the recommendation of Sir Charles M'Carthy, at that time the Governor of Sierra Leone, four forts only were retained, viz., Cape Coast Castle, Anamaboe, Dix Cove, and Accra. In 1827, in consequence of the heavy expenses incurred by the Government on account of the Ashantee war which broke out in 1824, and the decline of commerce on the coast, the public establishments were withdrawn from the coast; this arrangement some years afterwards was abandoned, and the whole coast was again placed under the direct control of the home Government. In 1843 Captain Hill, R.N., was appointed Lieutenant-governor of the Gold Coast, the forts still remaining dependencies of Sierra Leone. In 1847 Captain Winniett succeeded Captain Hill; he reported a great general improvement in the settlements acknowledging British jurisdiction during the last 10 years, and he calculated the natives coming under that jurisdiction at not less than 275,000, scattered over a territory of about 6,000 square miles.

The British territory had been defined by a convention with the Dutch Government, which came into effect on the 1st January 1868. By this arrangement the British Government received in exchange for Dix Cove, Appollonia, Secondee, and Commendah (which became Netherlands property or dependencies), Dutch Accra, Ber-raco, Apam, Cormantyne, and Moree.

Her Majesty's Government also relinquished to the Dutch the protectorate over Eastern and Western Wassaw, Appollonia, and Denkera in the interior. A line drawn due north from the mouth of the Sweet River to the Ashantee frontier (with slight deviations) was the boundary line.

A diminution in the population under British protection and its area followed. Probably 200,000 souls were then within the protected territory, and an average area of 4,500 square miles.

Gold Coast.

British territory and protectorate.

The interchange of territory in 1868 was not effected without some bloodshed, and owing to this it did not work well. The Dutch Government at length agreed to transfer to the British Crown the whole of their possessions on the coast of Guinea. By the royal convention ratified at the Hague in February 1872, Her Majesty's Protectorate on the Gold Coast has been doubled in extent and population. This new territory, extending from the Sweet River to the west of Apollonia, includes the best landing places and the richest gold districts in Guinea. It also contains the finest forts and castles. The castle of St. George d'Elmina was built by the first Portuguese governor Diego d'Azambya, in the 15th century. It was captured by the Dutch in 1637. Though it is a very recent addition to Her Majesty's colonial empire, yet, as it has been constantly occupied by Europeans since 1481, Elmina can now claim to be the oldest possession (excluding those in the Mediterranean) of the British Crown. During the 235 years of Dutch rule there were 104 governors.

Immediately in rear of the 300 miles of coast along which the posts occupied by the British are situated, and extending to a distance of about 80 miles inland, is a country inhabited by a number of native tribes, the principal of whom are the Wassaws, Denkeras, Akims, Assins, and Fantees, the whole of whom are included in what is termed the "Protectorate."

The Ashantees occupy their northern frontier, and the kingdom of Dahomey their eastern frontier.

The actual British territory consists only of the forts we hold upon the coast.

The Gold Coast Protectorate is an anomalous and somewhat unfortunate jurisdiction. Frequent collisions with the powerful Ashantee tribe have resulted from it within the present century, which have not been attended with invariable success on the part of the British Government; and this country is at the present moment again in arms against the king of Ashantee.

LAGOS.

Lagos.

From the settlement of Liberia, in longitude 11° west, to the River Benin, in longitude 5° east, a distance of upwards 1,000 miles, there is not on the whole extent of its surf-bound and dangerous coast an opening capable of admitting vessels, except at Lagos. On either side of this opening there is a safe and secure communication for boats, extending on the eastward as far as the Benin river, and on the

WEST AFRICAN SETTLEMENTS.

westward, throughout the whole border of the slave dealing kingdom of Dahomey.

Lagos.

Thus situated, it was natural that for many years the island of Lagos should have been the head quarters of this traffic in the bight of Benin, although at the same time the seat of a considerable trade in palm oil, and that its transactions, with all but the piratical slave dealers who infested it, should have been characterised by lawlessness and brutality.

Occupation.

The permanent occupation of this territory was deemed necessary for the complete suppression of the slave trade in the bight of Benin, for the protection and development of the important trade of which the town of Lagos was the seat, and for the benefit of the surrounding tribes of Africans.

At the present time the island of Lagos, with the towns of Badagry, Palma, and Leckie, the whole seaboard extending between them, with the waters of the lagoon, is recognized as British territory.

Trade, S. Leone.

TRADE.

The principal exports from Sierra Leone are oil, nuts, and seeds. Ginger also is becoming a prominent article of export. Less gold is supplied than formerly. With the exception of ginger and arrowroot, but a small proportion of the articles exported from the colony is raised within the peninsula. The Sherbro district, now belonging to the colony, contributes a considerable share, but by far the greater quantity of exports comes from the interior, the numerous rivers by which the country is intersected affording the natives a ready means of bringing their produce in canoes to Sierra Leone.

Cotton.

The cultivation of cotton is attracting some attention, but the country possesses such peculiar aptitude for the production of oil seeds, and recent researches have made known so many different sources from which valuable and useful oils can be obtained, that it is hardly likely that cotton growing will, for the present, be carried on extensively, or with much vigour.

Trade, Gambia.

Ground nuts, hides, and wax, form the principal articles of export from the colony of the Gambia, but six sevenths of the whole export consist of ground nuts.

The trade is comparatively of recent origin, having only commenced in 1845. In 1858 it had reached a value of 188,000*l*. Of late years, owing principally to war amongst the native tribes it has somewhat fallen off. The greater part of these nuts, probably three fourths, are exported to

France, where they are converted into an oil which is sold as olive oil, and is largely used for domestic purposes.

Gold Coast. Trade.

The Gold Coast is not an agricultural country, and the palm oil trade does not flourish to any extent in its neighbourhood; in the most prosperous condition of trade its exports, therefore, are not considerable. There is a considerable falling off in the quantities of palm oil produced in some years as compared with others, which is stated to be owing to failures in the crops, whilst the diminution in the amounts of gold dust, which comes from the interior, and chiefly through Ashantee, depends mainly upon the state of our relations with these people.

Lagos, Trade.

From Lagos the exports are palm oil, palm kernels, Shea butter, indigo, ivory, ground nuts, native manufactured cloth, cotton, calabashes, and benniseed.

The following table will show the value of the trade returns of the four settlements in 1871.

—	Imports.	Exports.	Vessels entered.	Vessels cleared.	Tonnage entered.	Tonnage cleared.
	£	£				
Sierra Leone -	305,849	467,755	411	409	110,646	110,919
Gambia - -	102,064	153,100	229	211	51,853	47,977
Gold Coast -	250,671	295,207	343	315	131,553	119,494
Lagos - -	391,653	589,802	278	275	125,776	125,168
	1,050,237	1,505,864	1,271	1,210	419,818	403,558

Thus over 1,200 vessels cleared and entered with cargoes exceeding two millions and a half in value in that year.

The annexed tables also show the revenue and expenditure, imports and exports, and population of each settlement during recent years, so far as these returns have been obtained.

SIERRA LEONE.

S. Leone.

Revenue and Expenditure.

	£	£
1856 -	35,601 -	34,452
1857 -	33,968 -	39,580
1858 -	39,681 -	28,931
1859 -	31,433 -	29,147
1860 -	33,734 -	31,136
1861 -	36,461 -	36,243

WEST AFRICA SETTLEMENTS.

S. Leone.

	£	£
1862	37,355	44,265
1863	47,136	47,051
1864	48,692	51,061
1865	46,934	59,042
1866	62,161	60,539
1867	64,871	69,062
1868	59,272	55,694
1869	69,617	70,465
1870	67,135	68,033
1871	80,406	76,130
1872	94,436	86,783

Population of each sex and colour in the years 1860, 1862, 1866, and 1871 :—

White.		Coloured.		Total.		
Males.	Females.	Males.	Females.	Males.	Females.	Total.
100	31	21,070	20,423	21,170	20,454	41,624
99	32	21,115	20,560	21,214	20,592	41,806
98	31	21,016	20,664	21,114	20,692	41,806
—	—	—	—	—	—	37,039

VALUE OF IMPORTS AND EXPORTS.

	£	£
1856	152,907	180,385
1857	172,315	288,728
1858	139,805	225,349
1859	169,727	247,261
1860	172,726	304,394
1862	144,269	268,814
1863	209,106	295,853
1864	190,441	201,808
1865	368,545	237,240
1866	373,269	259,719
1867	284,776	296,718
1868	295,826	296,466
1869	289,779	404,862
1870	280,864	392,191
1871	305,849	305,849
1872	411,935	383,635

GAMBIA.

REVENUE AND EXPENDITURE.

	£	£
1856	17,375	14,097
1857	16,434	17,737
1858	15,920	15,547
1859	15,599	16,962
1860	14,154	15,274
1861	16,162	16,492
1862	15,661	15,177
1863	17,263	19,325
1864	17,204	17,662
1865	14,758	17,151
1866	19,079	17,681
1867	22,415	18,664
1868	22,088	17,082
1869	15,518	20,236
1870	18,969	21,937
1871	17,490	16,662
1872	17,249	17,873

VALUE OF IMPORTS AND EXPORTS.

	£	£
1856	108,852	176,577
1857	118,620	201,628
1858	118,693	227,460
1859	76,149	110,364
1860	73,138	109,137
1861	109,581	136,837
1862	99,825	154,443
1863	172,965	141,673
1864	135,777	148,157
1865	128,808	138,693
1866	108,298	158,368
1867	193,420	214,389
1868	144,524	187,357
1869	94,027	109,312
1870	91,996	142,517
1871	102,064	153,100
1872	123,088	127,225

WEST AFRICA SETTLEMENTS.

POPULATION of each SEX and COLOUR in the year 1871:—

Dwelling.			Settlements.	Sex.		Total.
Stone.	Frame.	Wattle.		Males.	Females.	
117	266	603	Bathurst - - - -	2,139	2,452	4,591
2	10	800	British Combo - - -	2,319	2,100	4,419
1	—	748	Barra, Ceded Mile -	2,201	1,716	3,917
4	—	336	M'Carthy's Island -	647	616	1,263
124	276	2,487	Total population of the Settlements on the River Gambia	7,306	6,884	14,190

Gold Coast.

GOLD COAST.

REVENUE AND EXPENDITURE.

	£	£
1856 -	12,917 -	10,773
1857 -	7,410 -	7,492
1858 -	7,062 -	7,855
1859 -	8,286 -	7,568
1860 -	7,949 -	9,558
1861 -	9,334 -	9,195
1862 -	9,154 -	9,204
1863 -	8,574 -	9,409
1864 } No Blue-books received.		
1865 }		
1866 -	11,053 -	11,589
1867 -	10,839 -	10,993
1868 -	15,404 -	11,651
1869 -	24,127 -	18,836
1870 -	30,851 -	35,609
1871 -	28,609 -	29,094
1872 -	40,165 -	42,785

Population (estimated 1858), 151,346.

VALUE OF IMPORTS AND EXPORTS.

	£	£
1856 -	105,634 -	120,999
1857 -	118,270 -	124,394
1858 -	122,457 -	154,136
1859 -	114,596 -	118,563
1860 -	112,454 -	110,457

Gold Coast.

	£	£
1861	162,970	145,819
1862	145,100	102,086
1863	76,955	53,764
1864	No Blue-books received.	
1865		
1866		
1867	206,920	160,291
1868	—	—
1869	213,491	281,913
1870	253,397	378,239
1871	250,671	205,207
1872	260,101	385,281

LAGOS.

Lagos.

Revenue and Expenditure.

	£	£
1862*	7,130	6,510
1863	16,708	15,837
1864	21,335	22,805
1865	24,081	24,095
1866	23,823	23,602
1867	29,974	30,195
1868	33,895	33,711
1869	40,438	39,431
1870	41,683	42,379
1871	45,612	45,611
1872	41,846	41,346

Public debt, 13,810*l.* 17*s.* 6*d.*

Imports and Exports.

	£	£
1862	77,933	61,932
1863	171,138	158,341
1864	120,796	166,903
1865	114,284	175,636
1866	220,766	262,699
1867	321,997	513,157
1868	340,815	517,253
1869	416,895	669,598
1870	400,558	515,365
1871	391,653	589,802
1872	366,256	444,848

* The Lagos returns for 1862 are only for six months.

WEST AFRICA SETTLEMENTS.

POPULATION OF SETTLEMENT.

Males.	Females.	Total.
15,198	16,790	31,988

Climate.

CLIMATE.

With regard to the climate of the West African Settlements there can be no doubt that it is very prejudicial to the health of Europeans. A nearly vertical sun, rank vegetation, heavy rains, a most inefficient system of drainage, and a water supply which in a great many cases is liable to contamination from soakage, are conditions which, added to the habits and customs of the natives, tend to produce remittent and bilious fevers and dysentery, which are very destructive to human life.

There are nevertheless many British and other merchants who have lived on the coast for many years in the possession of good health.

The rainy season commences at the end of April and continues till July or August. Dense fogs succeed till October when the healthy season commences. The average height of the thermometer throughout the year is about 82°.

CHARACTER AND PROGRESS OF NATIVES.

Official reports tend to prove that in Sierra Leone the people are progressive, loyal, and contented, and that under English rule they have advanced in civilization and intelligence. There is, however, room and necessity for further improvement, and a desire for better and more uniform education.

The habits of the native population of the Gambia are not so satisfactory. There is a want of regular and steady industry, a carelessness and improvidence, and an addiction to thieving and intemperance amongst them. On the other hand, however, there are many who are intelligent, sober, and industrious.

On the Gold Coast the standard of morality is still very low, and the natives have an insuperable objection to do more work than is absolutely necessary for their subsistence. Many savage and revolting customs are still practised; but even amongst these people, demoralized as they are, it is asserted that some progress towards civilization has been made within the last 10 years.

Education appears to be much appreciated in Lagos, and indeed in all the settlements, the Wesleyan, Roman Catholics, and Church Missionary Society are using their best en-

deavours to civilize and christianize the communities with which they are brought into contact.

MANUFACTURES.

Manufactures.

With regard to manufactures Mr. Pope Hennessy, C.M.G., (lately Administrator in Chief), states that in Kambia some attempt is made in manufactures. From the cotton shrub that grows near every house the women pluck the raw material, from which they spin a coarse strong thread, which is woven in a native loom made of hard wood and leather prepared by themselves.

In the verandahs of the native houses, the country cloth, from which are made robes and other articles of wearing apparel, may be seen in process of manufacture, within a few feet of the plant still laden with the opening seeds, from which the material of the thread is plucked whenever it is required.

In the circular gate houses leading to the courtyards of the better classes the blacksmiths may be seen making hinges, nails, and other common articles from native iron. The same sort of ore that is to be found at Sierra Leone is also to be found in the interior; but though it is neglected on the coast, it is smelted in rude furnaces at Kambia, and is the material from which the blacksmiths make all the iron articles required in that district.

The negroes of the interior may also be seen tanning leather, colouring it with native dyes, and making sandals, shoes, and saddles.

In every village they are busy manufacturing oil for their own consumption and for the European markets. This manufacturing industry is altogether carried on by the negroes beyond our settlements.

At Elmina there are a considerable number of natives who have been trained by the Dutch as masons, carpenters, and blacksmiths. The native houses are strongly built of stone. At Cape Coast, eight miles off the native houses are built of mud, and there is very little attempt at industry to be seen.

The German missionaries at Akropong give technical instruction in their schools. They are zealous, and live in a healthy district, but as yet they have made no impression beyond a very limited area.

At Lagos, the liberated Africans, who have emigrated from Brazil, are disposed to be industrious. In this respect they are a great contrast to the liberated Africans of Sierra

WEST AFRICA SETTLEMENTS.

Leone. They number about 6,000 and are rapidly increasing.

Exhibits.

EXHIBITS.

The articles exhibited by Mr. Pope Hennessy, Mr. Salmon, Messrs. Banner Brothers and others, in behalf of the West African Settlements at Vienna, were specimens of the characteristic trinkets of the settlements—a collection of land shells, fancy groups of leather, articles of food, specimens of gold dust, monkey skins, ropes of Ashantee make, pipes and smoking reeds, sandals, wallets, and native manuscripts, native looms, palm oil, ground nuts, shells, gum, beeswax, cotton, &c.

It will be necessary with a view to the special object of this report to refer somewhat in detail to the principal products of the settlements.

Palm oil.

PALM OIL.

This valuable oil is derived from the pulp which covers the palm fruit, and which grows in large bunches near the top of the palm tree.

These nuts are chiefly gathered or cut from the tree about April. They are first pounded for the purpose of separating the pulp, and then boiled in water, the oil being skimmed from the surface and put aside for purposes of merchandize.

By far the greater proportion of this oil as well as of the kernels of the nut is brought to Great Britain, where it is chiefly used in the manufacture of soap, candles, &c. When fresh it is eaten in Africa as butter, and is also used there to make wine and soup. It is perfectly wholesome and very nutritious.

The following table shows the amount of palm oil imported into the United Kingdom during the years 1790 to 1869 inclusive, and the enormous increase of the trade.

Palm kernel oil.

PALM KERNEL OIL.

From the kernel of the palm nut this valuable oil is obtained, it resembles both in colour and character cocoa nut oil. Until within the last very few years these kernels were thrown away by the natives; now, though the trade is still in its infancy, from 40,000 to 50,000 tons are annually imported into Great Britain. It is noteworthy that all these nuts are broken by hand by the natives. The kernels only are exported, and the oil is expressed from them here; the refuse is made into cake, and is extensively used as food for cattle.

Palm Oil exports since 1790.

PALM OIL annually imported into the UNITED KINGDOM from the WEST COAST of AFRICA 1790 to 1869.

Years.	Quantity.	Years.	Quantity.	Years.	Quantity.
	Tons.		Tons.		Tons.
1790	130	1817	1,485	1844	20,730
1791	181	1818	1,465	1845	25,040
1792	230	1819	3,702	1846	18,340
1793	153	1820	873	1847	23,810
1794	79	1821	5,124	1848	25,500
1795	68	1822	3,188	1849	24,670
1796	Records burnt.	1823	3,275	1850	22,390
1797	108	1824	3,700	1851	30,420
1798	167	1825	4,268	1852	26,200
1799	207	1826	4,950	1853	31,830
1800	223	1827	4,712	1854	37,630
1801	195	1828	6,327	1855	40,500
1802	386	1829	8,996	1856	39,330
1803	489	1830	10,673	1857	42,740
1804	316	1831	8,160	1858	38,910
1805	216	1832	10,890	1859	34,289
1806	361	1833	13,350	1860	40,216
1807	111	1834	13,495	1861	37,016
1808	552	1835	12,816	1862	43,294
1809	749	1836	13,830	1863	39,511
1810	1,287	1837	11,160	1864	30,989
1811	1,177	1838	14,070	1865	35,319
1812	582	1839	17,170	1866	34,929
1813	Records burnt.	1840	15,770	1867	38,088
1814	967	1841	19,850	1868	41,500
1815	2,064	1842	21,000	1869	35,178
1816	1,191	1843	20,400		

A further interesting table is annexed showing the comparative value of the trade between England and its possession on the West Coast, and England and *"other parts"* of the same coast.*

* Compiled from F. Hutton & Co.'s Returns.

WEST AFRICA SETTLEMENTS.

Entire trade of settlements and other parts of coast.

EXPORTS.

	1863.	1864.	1865.	1866.
	£	£	£	£
British Goods to British Possessions in West Africa, 1st January to 31st December (12 months).	328,553	269,173	403,383	532,177
British Goods to other parts of West Africa, 1st January to 31st December (12 months).	655,238	571,306	642,467	601,368
	983,791	840,479	1,045,850	1,133,545

1867.	1868.	1869.	1870.	1871.	1872.
£	£	£	£	£	£
631,188	633,136	623,903	658,822	678,631	759,601
814,193	904,080	814,897	924,172	1,031,323	1,089,920
1,445,381	1,537,216	1,438,800	1,582,994	1,709,954	1,849,521

IMPORTS.

	1863.	1864.	1865.	1866.
	£	£	£	£
From British Possessions in West Africa, 1st January to 31st December (12 months), gross value.	191,207	295,386	402,692	513,732
From other parts of West Africa, 1st January to 31st December (12 months), gross value.	1,603,491	1,064,173	1,346,998	1,457,174
	1,794,698	1,359,559	1,749,690	1,970,906

1867.	1868.	1869.	1870.	1871.	1872.
£	£	£	£	£	£
399,061	538,431	609,256	401,925	541,920	471,248
1,518,994	1,908,678	1,643,918	1,758,537	1,963,142	2,011,219
1,918,045	2,447,109	2,253,174	2,160,462	2,505,062	2,482,467

Gambia.

GAMBIA.

Exports.

The exports at the present time are ground nuts, beeswax, hides, a little ivory and tortoiseshell, occasionally cotton and small quantities of gold, which, however, do not appear in the Customs returns. Mahogany, which was formerly largely shipped, is no longer a profitable export, though in the improbable event of a revival of the old high

prices for timber in Europe, this trade would again assume respectable proportions.

GROUND NUTS.

Ground nuts. Trade and cultivation.

The Ground Nut is indigenous to the soil. It is planted during the months of June and July, just as the rains commence. It springs up rapidly, and assumes somewhat the appearance of the English field tare. The shells or husks resemble slightly in shape the pods of the pea, and grow half imbedded in the light sandy soil; hence the various names applied, viz., ground nut, ground pea, pea nut. The shell or husk is about an inch in length, and of a light yellowish grey colour. It is very easily broken between the finger and thumb, and encloses two kernels about the size of large marrowfat peas, which kernels contain from 25 to 30 per cent. of oil. The nuts are planted in their shells in shallow holes scraped in the ground, and during growth require simply a little attention to keep them free from weeds. At the termination of the rains in October they are ready to be picked, which is done by bodily dragging the whole "bine" from the ground. The nuts adhering to the plant thus uprooted are afterwards threshed out by women with long light sticks, and picked up by children. They are then stored in roofless cane houses until the owner sells them to the merchant's traders. It is a singular proof of the faith and superstition of the people that these open stores receive no other protection than that derived from a verse from the Koran inscribed on a scrap of paper and stuck in a cleft of a stick which stands in the heap of nuts, and it is very seldom indeed that a negro finds courage to steal the produce and so brave the dangers threatened by the holy inscription. After the nuts are detached the plant, or "grass," as it is called, forms the chief food of horses, which thrive on it.

The first cargo of nuts, consisting of about 80 tons, was shipped from the Gambia in 1837 by Mr. Thomas Chown. The annual export is now about 16,000 to 17,000 tons, the average "free on board value" at Gambia is about 10*l.* per ton, in Europe 14*l.* Hitherto the largest quantities have been sent to France, where the oil which is there expressed from the nuts is largely used as a substitute for *olive* and *salad* oils. Soap and oil cake is also made from the refuse. Now the demand here is rapidly increasing, and as the cake that remains after the oil is extracted is in great request for cattle feed, it is not improbable that before long the shipments to this country will equal those to France. So increased has the inquiry become for this ground *nut cake* that one of the largest seed crushers in London, in

WEST AFRICA SETTLEMENTS.
Gambia. Ground nut.

order to meet the requirements of his customers has been obliged to procure further quantities from Marseilles, but of course if he could get the nuts in England in sufficient quantity it would pay him much better, and he is therefore making strong efforts to compete with the French firms by offering such prices as may induce the Gambia merchants to send their produce more largely to London.

During the American war, when the cultivation of this nut was stopped in the southern states, many cargoes were sent from Gambia to New York and Boston where the people *eat* them in large quantities, calling them pea nuts; when parched or roasted they make a capital addition to dessert. The price in America is still equal to that in Europe, but in the States they do not express oil from them, and so being used entirely for edible purposes, the demand is necessarily limited, though ground nuts would continue to be shipped there if suitable return cargoes for vessels back to Africa could be obtained, failing this it is not found so profitable shipping them there as to France.

Owing to constant wars and other risks, together with the difficulties of transport during the past five years, the merchants have sent their traders less frequently than formerly to the upper river beyond McCarthy's Island, the demand being thus lessened, the people have planted fewer nuts than before, but in the lower river where these disturbances are of less frequent occurrence, there is no doubt but that during each succeeding year a larger area of land is brought under cultivation; it is a curious, but not altogether fortunate fact, that the owners of the soil are not its largest nor most frequent cultivators, for each year a number of people living far in the interior and belonging to a tribe called Serawoolies, come down to the banks of the Gambia, and hire land on which they grow nuts. They remain generally about three years and then return to their own country, carrying with them the merchandize that they have received in exchange for their produce, by these means extending the use and demand for English manufactures. On the other hand, holding as they do as tenants the land on the Gambia for a short time only, they are anxious to get as much as possible from it at the least trouble and expense and do nothing to replenish it. The frequent wars in the upper river check these people from coming down, as they are very liable to be robbed both in their coming and returning. The ground nut crop is liable, like other cereals, to occasional failure, but because in certain years this occurs it must not be supposed that diminished supply means decreased demand.

BEESWAX.

Gambia. Beeswax.

Beeswax is at present the next most important export, its average price, free on board the export vessel at Gambia, is about 145*l.* per ton. The quantity annually shipped to England is about 110–120 tons. During the past year a small portion has been sent to France. Formerly large quantities of wax were brought into the port of Bathurst from the Portuguese settlements and rivers between Gambia and Sierra Leone, and so helped to swell the export of this article from Sierra Leone, but for the past six or seven years the wax has been shipped *direct* from those places to Europe. The wax is furnished by wild bees, which feed in swarms on the flowers that abound in the forests along the banks of the river. It is collected just before and during the rainy season by the natives, who bring it down to Bathurst and sell it to the merchants, who first refine it and then ship it to London or Liverpool, where it is chiefly used for candle making, though large quantities are reshipped to Russia for use in greasing cartridges. Gambia wax is also used for gold wire drawing, and the quality is considered equal to that of America and Jamaica, which hitherto have been preferred to all other kinds.

HIDES.

Hides.

Hides at one period formed a large trade, but in 1864–5 the cattle plague, which appeared simultaneously in Europe, ravaged the herds of cattle, and has never since entirely disappeared. The exports of these skins since then has hardly been a tenth of what it formerly was, but during the past three years the number of oxen has steadily increased, and it is to be hoped that the trade will before long attain its former magnitude. The hides are nearly all sent to the United States of America, where they command a good price.

GOLD.

Gold.

Gold in the infancy of the colony was one of its chief exports, but of late years it has been carried from the Upper Gambia to the forts and trading stations on the boundaries of the French colony of Senegal, which are nearer to the gold producing regions than Bathurst.

IVORY.

Ivory.

The elephants, by the widespread use of firearms amongst the natives, have been driven farther and farther inland, and very few of their tusks are now obtained.

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COTTON.

Gambia. Cotton.

Cotton, superior to any along the west coast, is grown all over the country watered by the Gambia; but it is in so much demand amongst the native themselves, that unless 10*d.* per pound can be obtained for it in England, the English merchants cannot afford to buy it from them. During the American war the people planted larger quantities than usual, and would have continued to increase their supply, had not the fall in price in Europe at the termination of the war diminished the demand. If the people were more industrious, the country is capable of producing an unlimited supply.

Beniseed.

BENISEED.

Beniseed is indigenous, and would with a little attention form a large addition to the annual exports. The natives, however, prefer to cultivate the easily grown ground nut, and so the progress of the country is slow and extremely sensitive to drawbacks of all kinds.

Tortoise-shell.

TORTOISESHELL.

Tortoiseshell could be obtained in much larger quantities than at present if the natives would take more trouble in capturing the turtle which abound at the mouth of and outside the river.

The trade of the Gambia is carried on by four French and five English firms, who employ agents or traders to go to various points in the river and purchase the produce from the surrounding natives. The best of these traders are natives of Sierra Leone. Some of them have small shops in the town of Bathurst, and are doing well. Nuts and other products in the river are bought for half cash and half goods; but all produce brought direct to Bathurst is paid for entirely with cash. The trade of the Gambia is doubtless capable of great expansion, as there is abundance of soil; thousands of acres which merely need the hand of the cultivator to make them teem with wealth; and if the population along the banks of the river should not be sufficient, thousands of natives would flock from the interior if there was a demand for the produce of their labour.

Of the Gambia, generally, it may be said that the capabilities of the soil to produce oil nuts, seeds, &c. are unlimited. Local disturbances have constantly checked the prosperity of the settlement, but the self-interest of the native chiefs and proprietors of the soil is teaching them the necessity of maintaining peace, if they wish to extract from that soil produce sufficient to purchase articles which are becoming to them necessaries of life.

Monkey Skins.—There was a considerable trade a few years ago in monkey skins, but I find no returns of the export since the year 1865 as a separate item. It appears that the principal demand is from France for purposes of military equipment, Assinee, Appolonia, Wassaw, and Akim are the localities nearest the coast in whose forests the monkey abounds. Monkey skins.

The monkey muffs sent by Mr. Salmon to Vienna were sold during the first few days of the Exhibition. The grey one was particularly admired. Skins of the grey monkey are scarce.

The West African settlements, in addition to the articles already mentioned, are rich in the production of teak wood, coffee, gum, copal, red pepper, and ginger.

Fair specimens of red pepper and ginger and gum copal were exhibited by Messrs. Banner.

Ashantee Ornaments, Implements, &c.—A list of the curious articles in use amongst the Ashantees, and exhibited by Messrs. Banner Brothers, of 3, Billiter Square, will be found in the Appendix. Ashantee ornaments and implements.

It is only necessary to notice—

1. The bag for keeping poisonous rings. These rings are of iron, copper, brass, or lead. They are used for striking people in time of war, and whoever is struck by a hand wearing these rings is said to fall to the ground insensible until the antidote is applied.

2. The case wherein is kept a certain black powder used for blackening the lower eyelids, a fashion not confined to savage tribes.

3. Brass bracelets worn by the worshippers of a god called O Sun, who is believed to be the wife of Thunder.

4. Pot for refined oil used by native women for polishing their bodies after washing.

The collection sent by Messrs. Banner, and the ancient manuscripts forwarded by Governor Pope Hennessy, formed together a most unique and interesting exhibition. They were treated collectively, and a medal of merit was awarded to Messrs. Banner, to a share of which Mr. Hennessy is certainly entitled.

Malachite.—A piece of malachite was also shown. It appears that there are malachite copper mines of great richness situated at Bembe, in the province of Angola, West Africa. Malachite mines.

The existence of these mines was known from the time of the first conquest of the Portuguese settlements on the West

WEST AFRICA SETTLEMENTS.

Coast, and notices of their richness are contained in the records of the Royal Library at Lisbon. The time may not be far distant when it may be possible to work these mines profitably.

The Ashantee weapons—clubs, arrows, &c., weapons of a past age—which are gradually being replaced by fire-arms of European manufacture, excited some attention in consequence of the outbreak of hostilities which was just announced.

A few remarks respecting the manuscripts and lesson boards exhibited by Governor Hennessy, at Vienna, may not be uninteresting, bearing as it does upon the important question of the education of the natives.

School boards.

The first lesson board in use in the infant schools in the interior is one on which simply large letters of the alphabet are written; they only form one word, "bismillah," meaning in the name of God.

The larger boards exhibited were those used by native children in the schools at Kambia. They were covered with a neatly written biography of Mohammed. All the children of the district, numbering some thousands, attend the morning and evening schools regularly.

One of the manuscripts beautifully executed was the writing of a negro in Arabic, containing his own observations of the various positions occupied by the moon and stars at different times of the year.

The other was a poem written in the form of an acrostic.

Conclusion.

Conclusion.—The climate of the West Africa Settlements is unsuited to the constitutions of Europeans, but the soil is rich, the features and capabilities of the country admirably adapted for extensive agriculture, and the vast numbers and physical strength of the native population in the interior, if properly directed, is sufficient for that purpose.

It is to be earnestly hoped that by some means or other the natives may be induced to cultivate the vast tracts of land now covered by primeval forest or bush, thereby giving employment to the people, encouraging a spirit of honest industry, and in a sanitary point of view improving the country by the removal of much rank vegetation, which in its present state creates malaria and consequent fever and ague.

Peaceful pursuits and civilizing wants, leading ultimately to the cessation of the great obstacle to civilization and trade, viz., petty intestine wars and feuds, can only exist in connection with a far more extensive cultivation of the soil than has hitherto been carried out.

My Report, which has reached a greater length than I anticipated, being finished, I wish in conclusion on behalf of the Colonies to express my thanks to the Royal Commissioners, and to their small but able staff of officials, for the cordial assistance they have at all times afforded me.

The services of the Committee for the Colonies, whose names are given below, were also extremely valuable; indeed it is difficult to estimate the assistance afforded to Colonial interests by Lord Ripon, Mr. Childers, Sir C. Cowper, Sir John Rose, and the other members of that body.

The Most Honourable the Marquis of RIPON, K.G.
The Right Hon. HUGH C. E. CHILDERS, M.P.
Sir JOHN ROSE, Bart., K.C.M.G.
Sir CHARLES COWPER, K.C.M.G.
Sir JAMES MCCULLOCH.
Sir FRANCIS SMITH.
P. G. JULYAN, Esq., C.B.
HENRY A. BRASSEY, Esq., M.P.
RICHARD DAINTREE, Esq.
FRANCIS S. DUTTON, Esq.
I. E. FEATHERSTON, Esq.
W. ROBINSON, Esq.
W. C. SERGEAUNT, Esq.

There is but one opinion in regard to the part taken by England and her dependencies at the Vienna Exhibition, and that is, that it was worthy of our great empire. In my opening remarks I stated why it was impossible for many of the Colonies to make an adequate exhibition of their produce.

Since writing those remarks, I have received information from some of the Colonies which leads me to the certain conclusion that they intend to take a more prominent part in the next Great International Exhibition at Philadelphia than they were enabled to take at Vienna.

There is only one other observation which I have to make, viz., that although England's colonial possessions were represented at the London and Paris Exhibitions of 1851, 1855, 1862, and 1867, no official record of their progress or report on the produce exhibited appeared in the Blue Books presented to Parliament at the close of those Exhibitions.

I could have wished that the duty of making the first Report of its kind had fallen to abler hands than mine. I have, however, done my best, and trust that what I have written will be of interest to the general public at home and in our Colonies, and of some small value to those who have commercial relations with our colonial dependencies.

WILLIAM ROBINSON.

BAHAMAS.

APPENDIX.

Exhibits by British Colonies.

BAHAMAS.

Ornaments from the seed of the Mimosa and Sea Side out.—Miss Grant.
Shell work and fish scale ornaments.—Mrs. Evans.
Back of hawksbill turtle, Conch shells and sponge } Mr. Williams and Mr. Allbury.
Fibres, rope, &c., made from the palmetto leaf.
Native woods and bark.
Wings of the flamingo.

CAPE OF GOOD HOPE AND NATAL.

CAPE OF GOOD HOPE AND NATAL.

GROUP I.

King & Co. C.E., Dowgate hill, London—
Picture of a gold quartz crushing machine.
N. Adler & Co., Port Elizabeth—
Gold ore.—Copper ore.—Natal coal.
Julius Mosenthal, 53, Great Tower Street, E.C., London—
Rough diamonds.—Gold.
Sir John Swinburne, Capheaton, Newcastle-on-Tyne—
Gold ore.—Ingot of gold.
Ochs Brothers, Hatton Garden, London—
Models of the largest rough Cape diamonds, one cut diamond.

GROUP II.

N. Adler & Co., Port Elizabeth—
Buchu (Barrosma grenulata).—Safflower.—Wool.—Silk.—Cape and Natal cotton.—Cape woods.—Gum.—Ostrich feathers.—Geat skins.—Wool sheep skins.—Sheep skins.—Gnu skins.—Ox hides.—Seal skins.—Oxhorns.—Giraffe bones.—Rhinoceros horns.—Ivory.—Mother-of-pearl.—Turbo shells.—Aloe.—Argal.—Vegetable wax.—Bees' wax.—Rock guano.—Birds island guano.
Julius Mosenthal, London—
Mohair.—Goat skins.—Sheep skins.—Model of an incubator for hatching ostrich eggs.
Poppe Schunhoffe Guttery, Cape Town—
Wool.
Russell & Co., Cape Town—
Guano.
De Pass Spence & Co., Cape Town—
Guano.

GROUP IV.

J. Wiley, Cape Town—
Wheat.
D. Cloete, Cape Town—
Wheat.
J. Mills. Cape Town—
Flour.
J. Lettersted & Co., Cape Town—
Flour.

Russell & Co., Cape Town—
Wheat.—Lentils.—Peas.—Mealies.—Beans.—Raisins.—Dried fruit.—Wines.

Collison, Sons & Co., Cape Town—
Wines.

J. P. Volsteedt, Cape Town—
Preserved fruit.

Jameson & Co., Durban (Natal)—
Preserves.—Natal cayenne.

B. Munich, Cape Town—
Cigars.

Otto Landsberg, Cape Town—
Snuff.

N. Adler & Co., Port Elizabeth—
Coffee.—Sugar.—Tobacco.—Arrowroot.

GROUP V.

Julius Mosenthal, London—
Mohair yarn and stuffs made of same.

Mrs. Julius Mosenthal, Paris—
Artificial fruit, flowers, and grain.

GROUP X.

N. Adler & Co., Port Elizabeth—
Two sticks made of rhinoceros horns.

GROUP XVII.

Union Steam Ship Co., Southampton—
Model of the Anglian S.S.—Model of the Syria S.S.
Photographs of two steamers.

Donald, Currie & Co., Fenchurch Street, London—
Model of the S.S. Windsor Castle.

GROUP XVIII.

Latham Brown, Secretary to the Cape Railway Company, London—
Picture of the Bergriver Bridge—Picture of the Welling Station.

Sir John Coode, C.E., 2, Westminster Chambers, Victoria Street, London—
Picture of the Table Bay Breakwater.

W. A. Richards, 4, Brown's Building, St. Mary Axe, London—
Picture of the Mail coaches to the Diamond Fields.

Siemens, Bros., London—
A piece of the submarine cable to Aden.

Standard Bank of British South Africa, London—
Framed list of their branches.

Julius Mosenthal, London—
Maps and charts.—Books.—Constitution of the Cape.

Wool export from the Cape of Good Hope from the official list of the Custom House.

CEYLON.

CEYLON.

A LIST of the PRODUCTS forwarded by the Commissioners appointed for the purpose by the Ceylon Government.

GROUP I.

No. of Package.

3. Specimen of plumbago, W. A. Fernando, merchant.
10. Elephant sculptured in plumbago, W. A. Fernando, merchant.
6. Specimens of iron ore.
   „ wrought iron.
   „ steel.
   Cylinder in which the latter is prepared.
   Wood of Ranawara (Cassia auriculata) used in preparing it.
   Implements of husbandry made of native iron (mamoty, or hoe, and knife used in reaping fine grain).
   } Mr. Layard.
16. Plumbago, Messrs. Volkart Bros.

GROUP II.

1. Bale of cinnamon of first quality, a superior sample, S. Rajapaksa, Esq.
2. Specimens of coffee, peeled and in parchment, Messrs. Carey, Strachan, & Co.
13. Specimen of coffee in berry.
   „ coffee in parchment.
   „ plantation coffee.
   „ native coffee.
   „ peaberry.
   } Messrs. George Wall & Co.
4. Cocoanut oil, Talip Akbar, manufacturer.
7. 1 box vanilla.
   1 box cinchona bark.
   } Mr. Layard.
10. Tea, from Kondagala estate, Ramboda, J. L. Bell, Esq., Ceylon Company, Limited.
14. Specimens of plantation coffee, Messrs. Volkart Bros.
15. „ cinnamon, Messrs. Volkart Bros.

(*c.*)

11. Fibres and cordage, Lunatic Asylum.
15. Specimens of coir yarn, Messrs. Volkart Bros.

(*g.*)

12. Nedun, Pericopsis Mooniana.
   Sapan, Cæsalpinia sappan.
   Milila, Vitex altissima.
   Halmilla, Berrya Ammonilla.
   Kitul, Caryota urens.
   Cocoanut, Cocos nucifera.
   Arecanut, Areca catechu.
   Satin, Chloroxylon swietenia.
   Ebony, Diospyros ebenum.
   Jack, Artocarpus integrifolia.
   Suriya, Thespesia populnea.
   Teak, Tectona grandis.
   Calamander, Diospyros quæsita.
   Mendora, Vatica (Isauxis) Roxburghiana.
   Palmyra, Borassus flabelliformis.
   } Mr. Layard.

Being specimens of woods used for building and for the construction of carriages and furniture.

GROUP III. (*e.*)

5. Rocella tinctoria, and dye prepared from it.
7. 2 bottles medicinal bitters.
   1 bottle cinnamon oil.
   1 „ clove oil (so called) from leaves of cinnamon.
13. 1 „ citronella oil, Messrs. Foulkes and Knight.

} Mr. Layard.

GROUP IV. (*g.*)

Specimens of Preserves.

7. 1 bottle Lovilovi jelly.
   1 „ Candied pumbaloe.
   1 „ Mango jelly.
   1 „ Marmalade.
   1 „ Plantain preserve.
   1 „ Pumpkin preserve.
   1 „ Pineapple preserve.
   1 „ Preserved dates.
   1 „ Bengali chutney.
   1 „ Cashmere chutney.
   1 „ Lime chutney.
   1 „ Mixed oriental pickles.
   1 „ Mixed pickles.
   1 „ Cucumber pickles.
   1 „ Pickled onions.
   1 „ Green chilly pickles.
   1 „ Bean pickles.
   1 „ Olives in mustard.
   1 „ Olive pickles.
   1 „ Bamboo pickle.
   1 „ Cabbage pickle.
   1 „ Lime pickle.
   2 bottles spirits of wine, prepared from molasses.
   2 „ Old Arrack.

} Mr. Layard.

9. Tapioca.
   Cassawa.
   Arrowroot.

} Alfred Model Farm.

GROUP V. (*b.*)

9. Cotton, from Sea Island seed.
   Cotton of Eriodendron orientale.
   Fibre of cocoanut (Cocos nucifera).
   Fibre of Kitul palm (Caryota urens).

} Mr. Layard.

GROUP VIII. (*i.*)

8. 2 sets Kalutara baskets (12 in each set).
   1 set large cigar case.
   4 sets smaller ditto.
   9 „ purses.
   2 „ smoking caps (all made of leaves of Phœnix silvestris).

JAMAICA.

CIGARS.

2,000 samples exhibited by Messrs. Soutar & Co., Kingston—
Imperiales—Regalias Britannica—Regalia del Rey—Napoleones elegantes—
Brevas—Londres—Galanes.

MAURITIUS.

MAURITIUS.

GROUP II.

J. Caldwell, Esq., and Mrs. de Chazal Moon—
44 plates of lithographed canes, introduced into Mauritius by Mr. Caldwell, and painted from nature, in New Caledonia, by Mrs. Moon.
1 report on New Caledonia.
1 classifying sugar canes.
16 plates, original, painted in Queensland.
6 ditto „ „ New South Wales.
36 ditto „ „ Mauritius.
(All cultivated in Mauritius.)

SUGAR CANES PAINTED FROM NATURE.

Of Queensland.

Nos. 61. Tugi.
62. Red ribbon cane.
63. Tabor socrat.
64. „ rappæ.
65. „ „ var.
66. „ mera.
67. „ pœti.
68. „ Djœndgœng.
69. Tabor socrat.
70. Trebæ.
71. Black cheribon.
72. Green à rose ribbon.
73. Caledonian.
74. „
75. Mauritius.
76. Queensland.

Of New South Wales.

Nos. 1. Bourbon.
2. Bales ribbon.
3. „ „
4. Bales ribbon.
5. Light purples.
6. Dark „

In Mauritius.

1. Plaines St. Pierre.
2. Belouguet verte.
3. „ blanche.
4. „ ordinaire.
5. „ vernissée.
6. Grande Baie.
7. Tamarin.
8. Diard verte.
9. „ blanche.
10. Malabarde.
11. Ghungham.
12. Tiboo Haur.
13. Tahiti blanche.
14. Tahiti verte.
15. Flaquine.
16. Giraffe.
17. Elephant.
18. Mapou rouge.
19. Mapou blanche.
20. „ marbrée.
21. Souchoniam.
22. Bois rouge bonde.
23. Mignonne.
24. Abondance.
25. Malamane.
26. Chicaga.
27. Reine blanche.
28. Egyptian striped.
29. „ yellow.
30. Bambou ghinghan.
31. „ verte.
32. „ rose.
33. Bantang.
34. Saïgon.
35. Reinette.
36. Avenir.

Sections of 62 kinds of Woods growing in Mauritius or from Indigenous Trees found in the Forests.

1. Labourdonnasia glauca.
2. Colophonia Mauritiana (B. Colophane).
3. Jossinia lucida (B. de Clous).
4. Jambosa venosa (one specimen).
5. Blackwellia glauca (B. Sagai, grandes feuilles).

6. Labourdonnasia revoluta (B. de Natte).
7. Haronga Madagascariensis (B. Haronge).
8. Olea lancea (B. Sauvage) Olivier.
9. Calophyllum spectabile (B. Tatamaka).
10. Memecylon trinerve (B. de Canne).
11. Antidesma madagascariensis.
12. Syzygium obovatum (B. de Bœuf).
13. Securinega nitida (B. Dur), one specimen.
14. Melicocca diversifolia (B. Gaulettes).
15. Diospyros reticulata (B. d'Ebène Batard).
16. Syzygium sp.
17. Erythrospermum sp.
18. Mimusops angustifolia (B. de Natte, petites feuilles).
19. Jossinia mespiloides (B. Nefie).
20. Erythroxylon sideroxyloides.
21. Syzygium sp. (B. Calebasse).
22. Quivisia ovata (B. Quisi).
23. Psathura myrtifolia (B. Cassant).
24.
25. Gaertnera vaginata (B. Cofé).
26.
27. Fropiera mauritiana.
28. Elæodendron orientale (B. Olive).
29. Prockia species.
30. Erythrospermum sp. (B. Bigagnon).
31. Ehretia petiolaris (B. Betel).
32. Diospyros melanida (B. d'Ebène marbré).
33. Tabernæmontana Mauritiana (B. de Lait à feuilles jaunâtres).
34. Mimusops Imbricaria (B. de Natte).
35. Sideroxylon sinerum (Tambalacoque).
36. Mithridatea tamburissa (B. Tambour).
37. Diospyros melanida.
38. Croton sp. (B. Violon).
39. Cylicodaphne cupularis (B. Cannelle, blanc).
40. Blackwellia integrifolia.
41. Cupania lævis (B. Sagai).
42. Badula reticulata (B. Pintade).
43. Mimusops sp. (Pomme de Songe).
44. Erythroxylon lancifolium (B. à Flambeaux).
45.
46. Gastonia cutisponga (B. d'Eponge).
47. Terminalia Catappa (Budamier).
48. Heriteria littoralis.
49. Nephelium Litchi (Litchi).
50. Syzygium Jambolana (Jamlongue).
51. Acacia elata (B. Noir blanc).
52. Lagerstrœmia indica (Goyavier fleur).
53. Hæmatoxylon Campechianum (Campeche Logwood).
54. Imbricaria coriacea (Pomme Jacquot).
55. Camphora officinarum (Camphor).
56. Morinda citrifolia (Murier de Java, B. Jaune). Chinese prepare a yellow dye from the bark of its roots.
57. Flacourtia Ramontchi (Prunier de Madagascar).
58. Nephelium Longan (Longan).
59. Psidium indicum (Goyavier de Chine).
60. Accacia Lebbek (B. Noir).
61. Hymenæa verrucosa Copalier (one specimen).
62. Tetranthera laurifolia.
63. Artocarpus integrifolia (Jacquier).
64. Cinnamomum cassia, Bitter cinnamon (Cannallier).
65. Casuarina equisetifolia (Filao).

J. HORNE,
Sub-Director, Royal Botanical Gardens.

MAURITIUS.

List of Fibres sent from the Royal Botanical Gardens, Mauritius.

Caladium purpurescens.
Ditto, a species of.
Fourcroya gigantea (a very valuable fibre for ropes, &c.).
Agave americana variegata.
Musa textilis (Manila hemp).
Musa, variety "Red-fruited banana."
Abutilon, variety "Duc de Malakoff."
Bœhmeria nivea, "China grass."
Musa violacea.
„ Paradisiaca, "Seed-bearing banana."
Hibiscus mutabilis, "Passe rose."
Helicteres hirsuta.
Dracæna mauritiana.
Bromelia spectrum.
Musa, species "Square-fruited banana."
Sida glutinosa.
Agave mexicana.
Guazuma tomentosa.
Ficus, a species of.
Morus tartarica, "Chinese mulberry.
Isora corylifolia.
Daphne viridiflora.
Pandanus utilis.
Hibiscus lilifloris.
Melochia tiliæfolia.
Carludovica palmata.
Cordia myxa.
Livistona mauritiana.
Latania aurea.
Ropoloçarpus lucidus.
Sagus Ruffia (Ruffia).
Malvaviscus arboreus.
Strelitzia juncea.
Sanseviera cylindrica, „ zeylanica, „ latifolia } These plants are said to yield the strongest known fibres.
Yucca gloriosa.
Agave americana (used for making ropes).
Ficus, a species of.
Urania (Ravenala) madagascariensis.
Sterculia, a species of.
Sanseviera zebrina.
Pandanus latifolius.
Musa, variety "Otahiete banana."
Sida velutina.
Pine apple (fibre from cultivated varieties)
Alpinia magnifica.
Heliconia gigantea.
Strelitzia Reginæ.
Theobroma Cacao.
Dracæna (fibre extracted from the stems).
Ficus, a species of.
Hibiscus, a species from Central Africa.
Colocasia antiquorum.
Ananas bracteatum.
Ficus indica.
Pterospermum acerifolium.
Hibiscus esculentus.
„ populnea.
Sponia orientalis.

Paritium tiliaceum.

Gomuti. From the trunks of Arenga saccharifera. Is much used as a substitute for horse-hair in stuffing cushions. In box No. 4 of Botanical Gardens.

Note.—The fibres are all from plants grown at the Botanical Gardens.

J. HORNE.

Mr. J. Horne—

63 sections of wood, of which 43, from No. 1 to No. 46, are from indigenous trees.

SECTIONS OF MAURITIAN WOODS.

Names, Botanical and Local.	Remarks on uses, &c.
1. Labourdonnasia glauca (Bois de Natte).	1. All of this order are more or less durable woods. They comprise the so-called "B. de Nattes," all of which are used for house and ship building, cabinet and furniture work. Barks good for tanning and dyeing, and seeds make excellent bird lime; diameter from 2 to 4 feet.
2. Colophania mauritiana (B. Colophon).	2. A resinous, heavy wood, much used for framing of carts, felloes of wheels, and in some parts of ships, buildings, breaks for railways, carriages, waggons, &c. It is a large tree, often attaining a diameter of 6 feet.
3. Jossinia lucida (B. de Clous) -	3. A slow-growing tree. Wood very hard and heavy, used in building; named from its extreme hardness.
4. Jambosa venosa - -	4. The Jambosas, of which there are five or six species in Mauritius, are woods commonly used for household purposes, tables, small planks, &c., one is used for the shafts of carriages. J. vulgaris makes excellent charcoal, tool handles, &c.
5. Blackwellia glauca (Bois Sagai) -	5. Three kinds of Blackwellia are used for building purposes, and for the axles of carts.
6. Labourdonnasia revoluta (B. de Natte).	6. There are several kinds of "B. de Natte," all of which are good for all building purposes, and are not excelled in durability by any other kind of wood.
7. Haronga madagascariensis (B. Horounge).	7. "B. Horounge" is little used and of no value, as the wood never attains a large size.
8. Olea lancea (Olivier Sauvage) -	8. An elastic wood used for shafts, tool handles, &c. Tree small, slow growing.
9. Callophyllum spectabile (B. de Tatamaka).	9. There are two or three excellent species of "Tatamaka," the woods of which are light and tough, difficult to work, very durable, serving for poles and for bullock carts, masts, and squared timber, &c.

MAURITIUS.

Names, Botanical and Local.	Remarks on uses, &c.
10. Memecylon trinerve (B. de Canne).	10. Seldom of large size, the wood is excellent and much esteemed by carpenters for handles to axes, &c. It is very elastic. Diameter 6 to 8 inches.
11. Antidesma madagascariens.	
12. Syzygium obovatum (B. de Bœuf).	12, 16, 21, and 50 are different species whose woods are used in house building, and the wood of one species (No. 50) is used for shafts.
13. Securinega nitida (Bois dur) -	13. The remarks to Nos. 17 and 30 apply equally to this.
14. Melicocca diversifolia (Bois Gaulettes).	
15. Diospyros reticulata (B. d'Ebène Batard).	15. Furniture, &c.
16. Syzygium sp. (B. de Pomme) -	16. Timber of excellent quality and useful for many purposes.
17. Erythrospermum species.	
18. Mimusops angustifolia (B. de Natte, petites feuilles).	18. *Vide* remarks on the "Nattes."
19. Jossinia mespiloides - -	19. Used in house building, grows to 10 inches in diameter.
20. Erythroxylon sideroxyloides (B. d'huile).	20. Yields good tough durable wood, but seldom found large. This is the common character of the Erythroxylum of the country.
21. Syzygium species (B. Calebasse)	21. *Vide* No. 12.
22. Quivisia ovata (B. Café) -	
23. Psathura myrtifolia - -	23. Small tree, wood durable and elastic, fit for handles of axes and shafts. A valuable medicinal tree.
(There are no specimens marked 24 and 26).	
25. Gaertnera vaginata.	
27. Fropiera mauritiana.	
28. Elæodendron orientale (B. Olive).	
29. Prockia species - - -	29. Wood good, durable, but liable to crack, is therefore seldom used.
30. Erythrospermum sp. (B. Bigagnon).	30. Wood used in shipbuilding; valuable, good for piles and posts, as it is very durable.
31. Ehretia petiolaris (B. Betel) -	31. Grows to 2 feet in diameter; wood used in housebuilding, but not valuable.
32. Diospyros melanida (B. d'Ebène marbré).	32. Common characters of the ebony. D. ebenum is the true ebony; the wood of both used for square timber in building, but will not support exposure, and it is of no use for planks as it invariably splits.
33. Tabernæmontana mauritiana (B. de Lait à fleurs jaunâtres).	
34. Mimusops Imbricaria (B. de Natte).	34. *Vide* "Nattes."

MAURITIUS.

Names, Botanical and Local.	Remarks on uses, &c.
35. *Sideroxylon cinereum* (B. Tambalacoque).	35. Tree tall, straight, large, some 5 feet diameter. Timber used in housebuilding, planks, shingles; almost indestructible if cut in proper season, makes very good piles.
36. *Mithridatea tamburissa* (B. Tambour).	
37. Diospyros sp. (B. d'Ebène)	37. Common properties of the ebonies. A tall, straight tree. Wood durable, used for furniture and housebuilding.
38. Croton sp.	
39. Cylicodaphne capularis (B. de Canelle blanc).	39. Timber used in shipbuilding, makes good planks, and furniture. Is one of the best native timber trees, but very scarce.
40. Blackwellia integrifolia	40. Is not found large enough to serve for more than axles, small planks, &c., a good wood.
41. Cupania lævis (B. Sagai).	
42. Badula reticulata (B. Pintade).	
43. Mimusops sp. (B. Pomme de Siège.)	43. Good wood, *vide* "Nattes."
44. Erythroxylon lancifolium	44. Never found large, but is used as lathes. It is almost indestructible.
(No No. 45.)	
46. Gastonia cutisponga (B. d'Eponge).	46. Only the heart wood durable, the outer and bark peculiarly soft and spongy.
47. Terminalia catappa (B. Badamier).	47. Wood fit for cabinet making and cornices, &c.
48. Heritiera littoralis.	48. Large tree, wood excellent, close grained, dark coloured; makes beautiful furniture, &c.
49. Nephelium Litchi (Litchi or Leechee).	49. Wood excellent, but not sufficiently abundant to be much used.
50. Syzygium Jambolana (Jamlongue).	50. *Vide* Nos. 12, 16, and 21.
51. Acacia elata (B. Noir blanc)	51. Timber said to be stronger than teak. Heart wood excellent, hard, and durable; useful for many purposes; stands a heavy strain.
52. Lagerstrœmia indica (Goyavier fleur).	52. Generally small in size, apparently good, little used, but hard and tough.
53. Hæmatoxylon Campechianum (Campeche Logwood).	53. Not often found large enough for building purposes, used for ornament and dyeing. This plant makes excellent hedges.
54. Imbricaria coriacea (Pomme Jacquot).	54. Wood good, but not common, and therefore little used.
55. Camphora officinarum (Camphor)	55. Grows to a large size. Wood used for boxes for preserving articles against insects.

Mauritius.	Names, Botanical and Local.	Remarks on uses, &c.
	56. Morinda citrifolia (Murier de Java).	56. A yellow dye is prepared from the bark of the roots of this tree by the Chinese.
	57. Flacourtia Ramontchi (Prunier de Madagascar).	57. Mostly small trees, with a hard wood, which is serviceable for small articles of furniture.
	58. Nephelum Longan (Longan) -	58. *Vide* "Litchi," No. 49.
	59. Psidium indicum (Goyavier de Chine).	59. *Vide* 52, the wood of which this very much resembles in quality, &c., but this is a much larger growing tree.
	60. Acacia Lebbek (Bois Noir) -	60. Heart wood used for naves and felloes of wheels; makes good charcoal, and formerly the French used to collect it largely and employ it as charcoal in gunpowder-making.
	61. Hymenæa verrucosa (Copalier).	61. Timber apparently good, strong, hard, but coarse grained. The tree yields gum copal; and it is very common in Madagascar, but exists in a very few places in a cultivated state in Mauritius.
	62. Tetranthera laurifolia (B. d'Oiseaux).	62. Used for shafts, tool handles, &c.
	63. Artocarpus integrifolia (Jacquier).	63. Wood useful for naves of carriage wheels, also for furniture. Yellow, beautifully coloured when fully matured.
	64. Mangifera indica (Mango) -	64. Often attains a large size. Wood soft, light, but tough, used for doors, packing cases, &c. It is scarce possible to draw nails out of it.
	65. Cinnamomum Cassia (Cannallier).	65. The better cinnamon of commerce.
	66. Casuarina equisetifolia (Filao) -	66. Axle trees, interior of houses, excellent firewood. Must not be exposed to moisture.

Group IV.

Sugar.—14 samples sent by James Wiehé, Esq.

1. Mr. W. Hewetson, Hewetson estate—
   Refining quality manufactured for European markets.
2. Messrs. Hart and De Bissy, Plaisance estate—
   Large crystals, manufactured for Australian market.
3. Mrs. Ww. Pellegrin, Constance estate—
   Medium crystals, manufactured for Australian market.
4. Mr. Kœnig, Médine estate—
   Large white crystals, manufactured for Australian market.
5. Mr. T. Thierry, Mon Désert estate—
   Soft white, manufactured for Australian market, without animal charcoal.
6. Mr. Manès, Constance estate—
   Good white, manufactured without animal charcoal, for Australian market.

7. Messrs. D'Arifat, Constance estate—
   Good white, manufactured without animal charcoal, for Australian market.
8. Messrs. Trebuchet & Co., Espérance estate—
   Good yellow, manufactured for Australian market.
9. Mr. A. Sornay, Beauchamp estate—
   Good refining quality, manufactured for European markets.
10. Mrs. L. Faduilhe, Clémentine estate—
    Fair yellow, manufactured for Australian market.
11. The Ceylon Company Limited, Mon Désir estate—
    Refining quality, manufactured for European market.
12. The Ceylon Company Limited, Solitude estate—
    Yellowish white, manufactured for Australian markets.
13. The Ceylon Company Limited, Astrœa estate—
    White, manufactured for Bombay.
14. Grande Baie estate—
    Good yellow, manufactured for Australian market.

Honourable H. Pitot. Six cases sugar.
Sugars A B C, crystallised in the vacuum pan, different sizes of crystals. These sugars have been filtered and manufactured without animal charcoal, and purged by turbines. The juice of the sugar cane has been treated according to Dr. Icery's process. These three boxes, with the one marked F, are white "Vesou" sugars.
Sugars D and E have been treated in the same manner as above, with larger crystals, and have been made from the syrup or refuse from the "Vesou" sugars.

Flore Mauricienne—
24 bottles preserved fruits.

H. Moizeau—
7 bottles pickles.

Widow J. Strong—
9 bottles pickles.

GROUP IV.

C. Dumat, Esq.
Statistics of sugar production—
1 plan of first class sugar mill.

GROUP V.

Messrs. Bourguignon & Co.—
Rope made of aloe fibre (*Fourcroya gigantea*), six sizes.

Mr. D'Unienville—
4 lbs. raw silk.

GROUP XII.

J. Kyshe, Esq.—
One copy Mauritius Almanack (1872).
Three copies „ „ (1873).

Mr. Moco—
16 photographs—Types of the Chinese, Indian, and Mambique inhabitants of Mauritius.
22 photographic views of landscapes, &c. (Mauritius).

GROUP XVII.

C. Meldrum, Esq., Government Observatory—
Meteorological charts.

MADAGASCAR PRODUCTS.

(Exhibited by Honourable H. Jourdain).

2 handsome silk lambas.
2 grass cloth nattes.
3 pieces fine grass cloth.
1 sample flax.
1 „ silk.
1 „ fibre.
1 „ cord.
3 samples india rubber.
7 cigar cases.
1 spoons.
2 fork.
1 cups.
1 specimen crystal.
4 samples gum.

NEW ZEALAND.

NEW ZEALAND.

COAL.

Collingwood Company—
Block of bituminous coal, Collingwood mine, Nelson. A first-class steam and gas coal. Cretaceous age. 6 seams, 1 to 4ft. thick.
Oakden—
Anthracite glance coal, from Acheron River, Canterbury. Altered brown coal. Eocene age. 4ft. seam.
M. B. Hart, Christchurch—
Glance coal (laminated) from Malvern Hills, Canterbury (4 specimens). Altered brown coal. Eocene age. 6 ft. seam.
Reefton Committee, Ajax Company, Nelson—
Specimen of coal. Cretaceous age. 10 ft. seam.
Ngakawau Company, Mount Rochfort, Nelson—
Bituminous coal (caking) (2 specimens). Cretaceous age. 16 ft. seam.
Provincial Government, Nelson—
Bituminous coal, from Brunner mine, Nelson. Cretaceous age. 18 ft seam.
J. C. Rowley—
Pitch coal, from Shag Point, Otago. Eocene age. 8 ft. seam.
Waikato Coal Mining Company, Auckland—
Pitch coal. 18 ft. seam.

From Colonial Museum—

Type specimens illustrating the classification of New Zealand coals.

Bituminous coal (caking)—
Specimen from Brunner mine, Nelson. In seams from 2 to 20 ft. in thickness.
Semi-bituminous coal—
Specimen from Pakawau, Nelson. Evaporative power commonly 6½ lbs.
Glance coal—
Specimen from Hill's Drive, Selwyn, Canterbury. Preservation Inlet and Malvern Hills.
Pitch Coal—
Specimen from Upper Buller, Nelson. Evaporative power 4·2 lbs.
Brown Coal—
Specimen from Kaitangata, Otago. Evaporative power 4·2 to 5·6 lbs. Saddle Hill, Otago; evaporative power, 5 lbs.

GOLD, MINERALS, AND ORES.

Alluvial Gold from the Province of Otago.

1. Skipper's, Queenstown—
From upper terraces, Skipper's Creek, Shotover River, about 1,400 feet above sea level.
2. Arrowtown—
From Arrow River, about 1,200 feet above sea level.
3. Queenstown—
From gullies adjoining and emptying into Wakatipu Lake, which is 1,000 feet above sea level.
4. Naseby (Mount Ida)—
Produce of sluicing claim at foot of Mount Ida, on northern side of Maniototo Plains, about 1,400 feet above sea level.
5. Palmerston—
Produce of sluicing claims in Shag Valley, 50 to 100 feet above the sea level.
6. Nevis—
Produce of sluicing claim about 1,400 feet above sea level.
7. Teviot—
Obtained by dredging the River Molyneux, about 350 feet above sea level.

8. Blue Spur, Lawrence—
   From sluicing claim. The hill or spur is about 150 feet high.
9. Manuherikia—
   Sluicing claim, about 500 feet above sea level.
10. Teviot—
    Produce of sluicing claim at an elevation of 600 to 700 feet above the sea.
11. Specimen of blue spur cement impregnated with gold.

Alluvial Gold from the Province of Nelson and County of Westland.

1. Alluvial gold from Moonlight Creek, Nelson, procured by washing the beds of creeks.
2. Alluvial gold from Waimea, Westland, obtained by washing beds of creeks. Samples taken from district through which the proposed Great Waimea Water Race would run.
3. Fine sea drift, Okarito, Westland, obtained by washing and sluicing the sea beaches.
4. Alluvial from Ross, Westland, obtained by deep-sinking, where the use of steam machinery is found to be necessary.
5. Equal parts of coarse and fine alluvial from the Lyell, Nelson, obtained by washing the beds of water-courses.
6. Alluvial from Grey Valley, Nelson, obtained by sluicing.
7. Alluvial sluiced, from Duke of Edinburgh Terrace, Greenstone Creek, Westland. The locality whence this sample came is traversed by the extensive Greenstone and Eastern Hohonu Water Race.
8. Alluvial, from the Ho-ho, Westland. Obtained by sluicing ground that had been previously worked by shafts and tunnels.
9. Fine alluvial gold, from iron sand cement, Charleston, Nelson. This sample of gold is usually saved by amalgamation with mercury, and is most difficult to obtain in its present form.
10. Ruby sand, from Charleston, Nelson. This sand is found in granite, and the gold it contains is heavier and of better quality than that in cement.
11. Gold-bearing black sand, from the black lead, Charleston, Nelson.
12. Auriferous cement, from Mokihinui River, Nelson. Obtained 50 feet below surface of river terrace.
13. Auriferous cement, from black lead, Charleston, Nelson.
14. Auriferous sand, from Addison Flat, Nelson.
15. Mokihinui River, Dufty Creek. Obtained from bed of creek by sluicing.
16. Upper Buller, Boatman's Creek. Alluvial gold obtained from tributary of Buller River by sluicing.
17. Lyell District, Lyell Creek. Alluvial gold obtained from tributary of Buller River.
18. Waimungaroa River. Alluvial gold obtained from tributary of Buller River by sluicing, and from the banks.
19. Mokihinui River, Mokihinui. Alluvial gold.
20. German Terrace, five miles from Westport; ridings and party. Sand and gold obtained from washdirt, after passing through ripple boxes. Exhibit taken from plush sheets.
21. Addison's Flat; T. B. Miller. Ruby sand obtained from washdirt.
22. Addison's Flat; T. B. Miller. Rubies obtained from washdirt.

Gold, as Imported.

1. One bar of melted gold from West Coast, Hokitika, Westland—

			oz.	dwts.	grs.
Assay—Gold	·9627=Fine Gold		9	14	16
Silver	·0363				
Copper	·0010				

Weight—10 oz. 2 dwts. 6 grs.

2. One bar of melted gold from Thames District, Province of Auckland—

			oz.	dwts.	grs.
Assay—Gold	·0565=Fine Gold		6	12	18
Silver	·3390=Silver		3	8	13
Copper	·0045				

Weight 10 oz. 2 dwts. 6 grs.

NEW ZEALAND.

3. One bar of refined gold, as extracted by chlorine refining process, and as exported by the Bank of New Zealand, Auckland—

		oz.	dwts.	grs.
Assay—Sold - -	·9942=Fine Gold -	0	19	20
Silver - -	·0059			

Weight—10 oz. 1 dwt.

6. Model representing a bar of gold, weighing 375 oz., as exported by the Bank of New Zealand, Auckland.

Specimens of Auriferous Quartz from Thames Mines, Auckland.

Specimen of quartz, from Tokatea Gold Mining Company, Coromandel, Auckland district, containing gold and silver in alloy. Weight of specimen, 74 oz. 7 dwts. 18 grs., and containing about 8 oz. of gold.

Quartz with gold, from Golden Crown Mine, Thames, Auckland. Weight 21 oz. 9 dwts., containing about 5 oz. of gold and silver in alloy.

Quartz with argentiferous galena, from Silver Crown Mine, Thames, Auckland. Weight, 15 oz. 4 dwts.

Auriferous Quartz, Inangahua and Lyell Districts, Nelson.

(Collected by the Reefton Committee.)

Victoria Company, Registered—
(3 specimens). Reef averages 3 feet in thickness. The specimens are taken from a level 360 feet below the highest point proved.

All Nations—
(1 specimen). This reef has an average thickness of 2 feet.

United Band of Hope Company, Registered—
(2 specimens). Specimen 1 was taken from the surface where reef first opened. From this about 100 tons of stone crushed gave a return of 2 oz. 6 dwts. per ton. From this level to a depth of 140 feet, about 80 tons crushed gave at the rate of 18 dwts. per ton. No. 2 is from a depth of 160 feet. From this last, 31 tons crushed at Westland machine gave a gross yield of 41 oz. melted gold.

Golden Hill Company—
(1 specimen). The reef varies from 4 feet to 1 foot 6 inches, average 2 feet 6 inches. About 480 tons of stone crushed at the Westland machine gave a yield of ½ oz. to the ton.

North Star Company, Registered—
(1 specimen). The specimen was taken from a level of 50 feet from the surface, a foot on the reef. The reef is 5 feet in width, bearing about E. and W.

Invincible Gold Mining Company, Registered—
(1 specimen). This specimen is from the surface, at a width of 2 feet on the reef, which is here 4 feet 6 inches thick.

Wealth of Nations Company, Registered—
(2 specimens). Two large bodies of stone have been intersected, each about 10 feet thick, showing gold similar to that in the outcrop.

Enterprise Company, Registered—
(6 specimens). These specimens were taken from the middle tunnel, at a distance of 110 feet from the mouth of the drive, at a depth of 85 feet from the surface.

Energetic Company, Registered—
(3 specimens). The stone was taken (1), from a shaft sunk 85 feet below a tunnel and 210 feet below the surface. A trial crushing in February last of 10 tons of this stone gave a result of 43 oz. 1 dwt. retorted gold; (2), from No. 2 tunnel, 265 feet below the surface, and at a distance of 298 feet from the mouth of the drive, at which place the reef is 4 feet 6 inches thick, and very solid.

Rainy Creek Company, Registered—
(1 specimen). The width of the reef where discovered is 30 feet, and it carries this extraordinary width for 900 feet. At the lower level it is heavier than at the surface.

Thompson's Claim, Boatman's, Inangahua—
(1 specimen). Shows a width of from 2 to 5 feet, and will yield from 1 to 2 oz. to the ton.

El Dorado Company, Registered—
Several small specimens. The reef where first opened was 3 feet in width. Further south it was cut 5 feet in width. The gold is fine, and well distributed through the stone. Zircons, garnets, cubical pyrites, manganese, and sulphides of antimony are also found.

Just-in-Time Company, Registered—
(3 specimens). The reef is 3 feet 6 inches wide. Specimens taken 15 feet below the level of the tunnel.

Inglewood, Kelly's Line, N., Murray's Creek, Reefton.
Specimens of quartz—
Obtained from leader just discovered on Mount Rochfort.

Alpine Reef, Lyell—
(1 specimen). The tunnel now used is situate at an altitude of 1,200 feet above the Lyell Creek. Besides the leaders at present being worked there are three others, averaging from 4 inches to 1 foot, the casing in most places being highly auriferous, and a well-defined reef of 5 feet wide, presenting characteristics similar to the leaders. The first crushing of 85 tons gave a yield of 860 oz. of melted gold.

Little Wonder Claim, Messrs. Carson and Cairns—
Quartz yielding per last crushing 10 oz. 9 dwts. to the ton. Area of claim four acres; worked by tunnelling. Reef, 6 inches to 2 feet wide; proved 120 feet. Specimens obtained 70 feet below surface.

Golden Crown Claim—
(1 specimen). This claim presents similar indications to the Little Wonder.

Auriferous Quartz, Collingwood Mines, Nelson.

Perseverance Mine—
Four rich gold specimens from a reef in tufaceous schist and black slate. Gold is associated with iron and copper pyrites, galena, and zinc blende.

From Colonial Museum—
Logan's Reef, Bendigo, Otago.
Turner's Reef, Cape Jackson, Marlborough (2 specimens).
Brecciated quartz reef (with vein of crystallized quartz), Waipori Bridge, Otago.
Sapphire, Collingwood, Nelson:
Weight 337 grains. Specific gravity, 3·869.

Junction Reef, Moanataiari Creek, Thames—
Specimen containing ores of gold, silver, lead, antimony, copper, and iron.

Golden Crown Reef, Thames—
Tufanite or Matrix rock traversed by auriferous quartz. 683 oz. of gold per ton.

Caledonian Reef, Thames, Auckland—

Hape Creek, Thames—
Block showing:
a. Quartz.
b. Crystals of quartz.
c. Mica.
d. Gold.
e. Silicate of copper.
f. Copper pyrites.
g. Oxide of iron.

Auriferous Stibnite—
Ferruginous sulphide of antimony in auriferous quartz. The pure mineral contains about 72·73 per. cent. of antimony, which has a value, when extracted, of about 25*l.* per ton.

Lyell, Westland—
Gold-bearing quartz.

Lyell Reefs—
Rich gold-bearing quartz (2 specimens).

NEW ZEALAND.

Ferriferous platinum.

Platiniferous iron sand—

Colonial Museum. (Orepuki Diggings, north shore of Foveaux Straits.)
Contains about one grain of platina per pound of sand.

Platina separated from above by washing:

Composition—Platinum with a little iridium	85·37
Iron	13·65
Gold and quartz	0·98
	100·

Minerals, &c.

From Colonial Museum—

Magnetic iron ores—

Magnetic iron ore, Dun Mountain, Nelson. From a vein 16 inches thick in serpentinous slates.

Magnetic iron ore, Wakatipu Lake, Otago. From a vein in mica schists.

Magnetic iron ore, maramara, Frith of Thames. From a vein in ferriferous slates; contains also oxides and titanium of manganese.

Iron band ore, Nelson. Contains 70 per cent. of iron. Also Wyndham River, Otago, and Manukau, Auckland, formed by the black sand-layers becoming cemented with hæmatite. This would be a most valuable ore if obtained in large quantities.

Black iron sand, from beach at Taranaki.

Compound of iron sand, ferruginous earth, and ground charcoal.

Iron sand cemented by heat.

Bloom of iron.

Bar of crude metal as from the blast furnace.

Bar of crude titanic steel.

Bar of workable steel.

Hæmatites—

Specular iron ore, Dun Mountain, Nelson. Occurs in irregular veins in greenstone rocks; contains 63 per cent. of metallic iron.

Specular iron ore, Maori Point, Shotover, Otago. A 6-foot vein in mica schist, equally rich with the above, extent unknown. This ore forms the large heavy pebbles known as black Maori in the auriferous gravels of the diggers.

Compact iron ore, D'Urville Island, Nelson. Vein, thickness unknown, in diorite slate, with serpentine and chrome, yields 63 per cent. of iron.

Concretionary hæmatite or limonite, Mongonui, Auckland. Occurs strewn on the surface from the decomposition of clays, associated with lignite seams; a common ore.

Hæmatite (about 40 per cent. of iron), Collingwood, Nelson. Occurs intermixed with quartz pebbles in a stratum 100 feet thick, exposed over several acres.

Hæmatite. Exhibited by W. Lodder, Auckland.

Hæmatite, Collingwood. Exhibited by Johnston and Louison, Nelson.

Hæmatite, pigment. Exhibited by Johnston and Louison, Nelson.

Ironstone (2 specimens). Exhibited by E. Ford, Christchurch, Canterbury.

Ironstone, Malvern, Canterbury. Exhibited by W. Wilson, Christchurch, Canterbury.

Bog iron ore, Spring Swamps, Auckland. Forms thick layers at the bottom of swamps. Though rich in iron, the ore is inferior, on account of the sulphur and phosphorous it usually contains.

Reniform iron ore, hydrous hæmatite, Mongonui.

Carbonaceous iron ore, with coal seams.

Chrome ores—

The pure ore contains 50 per cent. of the chrome oxide, and is worth from 11*l.* to 20*l.* per ton, according to the state of the market. Used for manufacture of pigments and dye salts.

Massive chromic iron.

Chrome ores—*cont.*

Crystallized chromic iron. From irregular lodes in serpentine bands. Dun Mountain, Nelson.

Dunite, interspersed with crystals of chrome ore. Dun Mountain, Nelson.

Copper ores—

Copper pyrites. Mixture of sulphides of copper and iron. From a lode 3 to 5 feet thick in mica schist, Moke Creek, Wakatipu Lake. The ore is very pure, and contains from 11 to 55 per cent. of metallic copper; the usual average of such ore in Cornwall being only 5 per cent. There is limestone in close vicinity to the lode, so that there would be no difficulty in reducing the ore to a "regulus," in which state it would save cost in shipment.

Grey sulphide, Wangapeka, Nelson. Contains 65 per cent. of copper, together with a little silver and gold.

Cupreous iron ore, in Serpentine, Dun Mountain. Interesting from its being slightly auriferous. The present value of crude (unrefined) copper is 30*l.* per ton.

Copper ore. *Decimal Company's Mine, Collingwood, Nelson.*

Graphite. *Collingwood, Nelson.*

Lead ores—

Galena, Wangapeka, Nelson. Sulphide of lead, with quartz that contains also sulphides of iron, and antimony with gold, in veins in felspathic schist. The galena contains 26 oz. of silver per ton. The gold is only in those parts of the ore that contain pyrites.

Galena with zinc blende, Perseverance Mine, Collingwood, Nelson. Occurs in a band 2 to 5 feet thick, parallel with the auriferous quartz veins. These two ores are both pure, but so intermixed in the lode that they could not be reduced separately. 100 tons is being sent to Great Britain to test the value of this ore.

Zinc ore (yellow or horn blende)—

This ore occurs in the Perseverance Mine, Collingwood, Nelson, and in small quantity in Tararua Creek, Thames, in white cement with auriferous veins. It contains 60 per cent. of metallic zinc, which is worth about 15*l.* per ton.

Manganese ores—

Uses: For generation of chlorine for bleaching purposes; also for calico printing, &c. The value of these common ores is 3*l.* to 4*l.* per ton.

Rhodonite (silicate of manganese), Dunstan, Otago. As rolled masses. Per-centage of manganese about 40.

Wad (hydrous oxide). Port Hardy, D'Urville Island, Nelson. Per-centage of manganese about 45.

Braunite or manganese, or Malvern Hills, Canterbury. Exhibited by E. Ford, Christchurch.

Petroleum rock oil—

Oozes from cracks in trachyte breccia, Sugarloaf Point, Taranaki. Wells have been bored to the depth of many hundred feet, but no steady supply of oil has been obtained. Crude oil has a specific gravity of 962·7 at 60°, and yields by fractional distillation oils having the following gravities:

2	per cent.	of oil	of sp. gr.	-	·874
10	,,	,,	,, -	-	·893
8	,,	,,	,, -	-	·917
60	,,	,,	,, -	-	·941
80					

The kerosene oil of commerce has a density of ·810 to ·820.

This oil is therefore quite unadapted as a substitute for kerosene, but might be used with great advantage as a lubricant.

Petroleum—

Waiapu, east coast of Auckland Province; crude oil has a specific gravity of ·872 at 58° Fahr.; boiling point, 290° Fahr.; flashing point, 230° Fahr. This oil yields, when distilled, oil as follows:

NEW ZEALAND.

Fine lamp oil	11·	per cent. of sp. gr.	·820
Inferior lamp oil	37·75	„ „	·853
Lubricating oil	25·69		
Paraffine	16·00		
Bituminous residue	9·36		
	100·		

By repeated rectifications this oil would probably yield 20 per cent. of lamp oil adapted for consumption in common kerosene lamps. A small sample of oil from the same district had specific gravity ·866, and gave, when twice rectified, 10 per cent. of lamp oil of specific gravity ·819, or at proof, 40°.

Petroleum oil—
Waipawa River, Poverty Bay, Province of Auckland.

Steatite—
Collingwood, Nelson. Occurs in a large mass or dyke in the Parapara Valley.

Marble—
Collingwood, Nelson. Forms a large part of a mountain range, and could be quarried and shipped with facility in blocks of any size.

BUILDING STONE, FIRECLAY, &c.

Austin and Kirk, Kowai, Canterbury—
Fireclay, ground.

Austin and Kirk, Kowai, Canterbury—
Fireclay, "pugged."

Waikato Coal Mining Company, Auckland—
Firelay.

W. Wilson, Christchurch, Canterbury—
Marble for lime, from Upper Malvern, Canterbury.

E. Gadd, Hillsborough, Canterbury—
Graystone.

D. Enys, Castle Hill Station, Canterbury—
Stone, from Castle Hill, West Coast Road; one side cut with saw, two sides natural state, one side rough dressed. Can be obtained any size.

M. B. Hart, Christchurch, Canterbury—
Two vases turned from freestone.

Houble. E. Gray—
Trachyte Dykestone, Banks Peninsula, Canterbury.

Eadie—
Limestone, Ashley Gorge, Canterbury.

M. B. Hart, Christchurch, Canterbury—
Glass sand, from Ashley Gorge.

GRAIN AND AGRICULTURAL PRODUCE.

J. and T. Meek, Oamaru, Otago—
One peck velvet chaff wheat.
One peck Tuscan wheat,
One peck purple straw wheat.

F. Cunningham & Co., Christchurch, Canterbury—
One peck wheat.
Ditto.
Ditto (grown by P. B. Luxmore).
Ditto (grown by Pareora Association).
Ditto.
Ditto.
Ditto.
Ditto (grown by F. Jones.)
Ditto.
Ditto.
Ditto (grown by T. Anderson).
Ditto (grown by R. Smith).
Ditto (grown by W. Williams).

P. Cunningham & Co.—*cont.*
One peck wheat (grown by J. Jones).
Ditto (grown by J. Campion, 67½ lbs. per bushel).
J. H. Rogers, Canterbury—
One peck wheat (grown by exhibitor).
Ditto (ditto).
J. N. Tosswill, Canterbury—
One peck wheat (grown by exhibitor).
W. D. Wood, Christchurch, Canterbury—
One peck wheat, Tuscan (grown by Carlton of Riccarton).
Ditto, imperial (grown by Deans of Riccarton).
Ditto, Suffolk white (grown by Deans of Riccarton).
Ditto, velvet chaff (grown by Cameron of Downs).
Ditto, pearl chaff (grown by Orr of Hawkins).
Ditto, Hunter's white (grown by Cameron of Saltwater Creek).
W. H. Lane, Christchurch, Canterbury—
One peck oats.
Ditto.
J. G. Bluett, Leeston, Canterbury—
One peck spring wheat. Cut January, 1872.
P. Cunningham and Company, Christchurch, Canterbury—
One peck oatmeal. Manufactured by E. Steggall of Southbrook.
J. and T. Meek, Oamaru, Otago—
One peck flour.
J. H. Rogers, Canterbury—
One peck flour (grown by exhibitor).
W. D. Wood, Christchurch, Canterbury—
One peck flour, from all Tuscan wheat.
Ditto, from mixed wheat.
One peck sharps.
One peck flour, from all pearl wheat.
W. H. Lane, Christchurch, Canterbury—
One peck flour, from all pearl wheat.
One peck sharps.
G. Pannell, Christchurch, Canterbury—
One peck flour.
New Zealand Agricultural Society, Auckland—
Two samples of wheat (grown by James Runciman).
E. W. Trent, Christchurch, Canterbury—
Samples of chicory (grown by exhibitor).

WOOL.

H. P. Murray-Aynsley, Mount Hutt Station, Rakaia Gorge, Canterbury—
Exhibit of Merino fleeces, 6 and 8-tooth male sheep, 11 months growth. First combing; hot-water washed with Lande's patent soap. Weight 2¾ lbs. Average price of previous clips in London, 1*s.* 9*d.* to 2*s.* 5½*d.*
Canterbury and Otago Association, Levels, Canterbury—
Exhibit of Merino wool, ram hoggetts. First combing; scoured.
Robert Tinline, Fernichurst, Amuri, Nelson—
Exhibit of Merino fleeces, ewe hoggetts, 14 months growth. First combing; in grease. Weight 6½ lbs.
G. A. Anstey, Parnassus, Amuri, Nelson—
Exhibit of Merino fleeces, ram lambs, 14 months growth. First combing; in grease. Weight 5 lbs.
Canterbury and Otago Association, Levels, Canterbury—
Exhibit of Merino fleeces, 4-tooth ewes, 12 months' growth. Greasy. Weight 6½ lbs. Average price of previous clips in London, 1*s.* 3*d.*
G. A. Anstey, Parnassus, Nelson—
Exhibit of Merino fleeces, 6-tooth ewes, 11 months' growth. First combing; greasy. Weight 5½ lbs.
T. S. Tancred, Raukapuka, Canterbury—
Exhibit of half-bred Leicester and Merino fleeces, ewe hoggets, first cross, 13 months' growth. First combing; greasy. Average price of previous clips in London, 1*s.* 6*d.*

NEW ZEALAND.

S. Bealey, Hororata, Canterbury—
Exhibit of half-bred Romney Marsh and Merino fleeces, hoggetts, first cross. Greasy. Average price of previous clips in London, *1s. 5d.* to *2s. 6½d.*

P. C. Threlkeld, Flaxton, Canterbury—
Exhibit of half-bred Lincoln and Leceister fleeces, 4-tooth and hoggetts, ewes and rams, 12 months' growth. Weight 18½ lbs. Average price of previous clips in London, *1s. 4d.*

Ernest Gray, Huon Hay, Canterbury—
Exhibit of Leicester fleeces, ewe hoggetts, 15 months' growth. Greasy. Weight 13 lbs.

T. S. Tancred, Raukapuka, Canterbury—
Exhibit of half-bred Leicester and Merino fleeces, first cross, ewe hoggetts, 13-months' growth. First combing; greasy. Average price of previous clips in London, *1s. 6d.*

H. J. Tancred, Grass Lea Farm, Canterbury—
Exhibit of Romney Marsh and Merino fleeces, third cross, wethers, 12 months' growth. Greasy. Weight 11½ lbs. Price of last year's clip in London, *1s. 6½d.* (two qualities.)

H. P. Murray-Aynsley, *Mount Hutt Station, Canterbury*—
Exhibit of Merino fleeces, ewe hoggets, 15 months' growth. Hot water washed. Weight over 2 lbs. Average price for previous clips in London, *1s. 9d.* to *2s. 5½d.*

John Hall, Hororata, Canterbury—
Exhibit of Merino fleeces, ewe hoggets, 15 months' growth. Cold water washed. Weight 5 lbs.

Robert Chapman, Spring Bank, Canterbury—
Exhibit of Merino fleeces, ewe hoggets, 13½ months' growth. First combing; cold water washed. Weight 3¾ lbs. Average price of previous clips in London, *1s. 10d.*

Matheson's Agency, Fernside, Canterbury—
Exhibit of Merino fleeces, 4 to 8 tooth ewes, 12 months' growth. Washed.

H. P. Murray-Aynsley, Mount Hutt Station, Canterbury—
Exhibit of Merino fleeces, ram hoggetts, 15 months' growth. Scoured.

A. H. Cunningham, Rangiora, Canterbury—
Exhibit of Merino fleeces. Scoured.

New Zealand Agricultural Society, Auckland—
Long wool in grease, 8 hoggett fleeces, Lincoln and Leicester. Grown by J. Wallace.

T. B. Gillies, Auckland—
Three ewe fleeces, three hoggetts; long wool in grease. Grown by F. R. Claude.
Six ewe fleeces; long wool in grease. Grown by J. Wallace.

L. D. Nathan and Company, Auckland—
Long combing wool. Scoured. Two cases. Grown by Reid Brothers. Motutapu.
Long combing wool. Scoured. One case. Grown by Middleton, Papakura. Assorted and scoured at the Turanga Creek Wool-scouring Works.

Marcroft and Ayers, Lincoln Road, Canterbury—
21 samples of long wool from pure bred Lincoln, Leieester, Cotswold, Romney Marsh, and Reyment breed of sheep, and cross-bred Cotswold 7–8 Leicester. All cold water washed.

PHORMIUM TENAX, OR NEW ZEALAND FLAX.

Raw and Manufactured.

Rees and Company, Wanganui, Wellington—
One bale dressed.

Richardson and Company, Ashley Gorge, Canterbury—
One bale scutched. *30l.*
Ditto. hackled. *32l. 10s.*

Chinery, Rangiora, Canterbury—
One bale, bleached and hackled.
Ditto. bleached and scutched.

Dumerque and Place, Waikuku, Canterbury.
B1 bale, stripped, washed, and scutched.
B2 ditto, stripped and washed only.
B3 ditto, stripped, washed, and hackled.
B4 ditto, stripped, washed, and bleached.
Hunt Brothers, Auckland—
One bale dressed.
C. Goulter, Blenheim, Marlborough—
One bale, dressed.
Ditto, dressed and scutched.
Ditto, ditto.
Ditto, dressed and hackled.
Berry, Parker, and Company, Leithfield, Canterbury—
No. 1. Bale, stripped and washed only.
No. 2. Ditto, stripped, washed, and scutched.
No. 3. Ditto, stripped, washed, scutched, and hackled.
Richardson and Company, Ashley Gorge, Canterbury—
One bale, stripped, boiled, and hackled. 32*l.*
Chinery, Rangiora, Canterbury—
One bale boiled and hackled, with sample of tow from the same.
G. Gould, Halswell, Canterbury—
No. 1. One bale, stripped, water-scutched, hot-water washed, and machine-hackled.
No. 2. Ditto, ditto, with sample of tow from same.
Bevan and Sons, Wellington—
One bale, native-dressed and hackled.
Colonial Museum, Wellington—
Samples of native-dressed.
One bale very superior ditto.
Kinross and Company, Hawke Bay—
Native-dressed flax.

Manufactured.

Bevan and Sons, Wellington—
Assortment of cords and twines. Manufactured from native-dressed fibre by exhibitors.
Kinross and Company, Hawke Bay—
Nine exhibits of cordage and twines, made from Maori-dressed fibre.
Grant and Company, Otago—
Assortment of cordage. Manufactured by exhibitors.
Auckland Patent Steam Rope Company, Auckland—
1 coil 6 inch 4 strand white rope.
1 „ 6 „ 4 „ oiled „
2 „ 5 „ 4 „ „ „
2 „ 4 „ 4 „ „ „
2 „ 3½ „ 4 „ „ „
2 „ 3 „ 3 „ „ „
2 „ 2½ „ 3 „ „ „
1 coil of white rope.
Canterbury Flax Association, Christchurch, Canterbury—
Assortment of cordage, tarred and untarred. 7 exhibits.
T. Lennon, Christchurch, Canterbury—
Assortment of cordage, ropes, and twines. Manufactured by exhibitor.
W. Cook, Nelson—
12 exhibits, all manufactured by exhibitor, viz.:—2 hearth rugs, 2 parlour mats, 2 bedroom mats, 4 hall mats, 1 railway mat, and 1 carriage mat.
Simons and Malcolm, Nelson—
2 door mats.
Colonial Museum, Wellington—
10 Maori mats, viz.:—
1 flax and Kaka feathers.
1 flax and pigeon feathers. (Kereru.)
1 flax and Kiwi feathers. (Eheruheru.)

NEW ZEALAND.

Colonial Museum, Wellington—*cont.*
3 Parawai mats.
1 Piu Piu.
1 Korowai.
1 Pota.
1 Pureke.
Shoes, apron, bag, dyed fibre, of Maori manufacture.
Tarahora—
1 fancy mat, Maori manufacture.
J. B. Armstrong—
Phormium seeds. Varieties.

NEW ZEALAND WOODS.

Wood Sections, with Bark, Foliage, and Inflorescence.

Auckland—
Dammara australis, native name Kauri.
Dammara australis, var., *mottled Kauri.*
Libocedrus doniana, *native name Kawaka.*
Podocarpus ferruginea, *native name Miro*
Podocarpus spicata, native name Matai.
Podocarpus totara, native name Totara.
Podocarpus dacrydioides, native name Kahikatea.
Dacrydium cupressinum, native name Rimu.
Phyllocladus trichomanoides, native name Tanekaha.
Persoonia Toro, native name Toro.
Elæocarpus dentatus, native name Hinau. A white wood. Used for turners' work.
Alectryon excelsum, native name Titoki.
Dodonæa viscosa, native name Ake-ake.
Dysoxylum spectabile, native name Kohe-kohe.
Sophora tetraptera, native name Kowhai. A timber of great density and durability. Used for tools and machinery purposes.
Metrosideros robusta, native name Rata.
Metrosideros tomentosa, native name Pohutukawa.
Leptospermum ericoides, native name Rawiri.
Panax crassifolia, native name Horoeka. Lancewood.
Olearia Cunninghamii, native name Wharangipirau.
Vitex littoralis, native name Puriri. Resembles Lignum vitæ, one of the most durable timbers known.
Tetranthera calicaris, native name Mangiao.
Nesodaphne tarairi, native name Tarairi.
Nesodaphne tawa, native name Tawa.
Santalum Cunninghamii, native name Maire.
Knightia excelsa, native name Rewa-rewa.
Atherosperma novæ-zelandiæ, native name Pukatea.
Corynocarpus lævigata, native name Karaka.
Santalum Cunninghamii, native name Black maire.
Myrsine australis, native name Mapau.
Myrsine salicina, native name Tipau.
Myrsine salicina, var., Mapau.
Hoheria populnea, native name Hohere.
Dracophyllum latifolium, native name Nei-nei.
Eugenia maire, native name Maire-tawaka.
Hedycarya dentata, native name Porokaiwhiri.
Fagus fusca, native name Tawai.
Coprosma arborea, native name Karamu.
Wellington—
Podocarpus, *undescribed sp., native name Kahikatea.*
Slab of ditto.
Leptospermum ericoides, *native name Manuka.*
Olea Cunninghamii, *native name Black maire.*

Wellington—*cont.*
Knightia excelsa, native name Rewa-rewa.
Eugenia maire, native name Maire-tawhake.
Nesodaphne tawa, native name Tawa.
Olearia Cunninghamii, native name Akewharangi.
Myrsine salicina.
Dysoxylum spectabile, native name Kohe-kohe.
Coprosma rotundifolia, native name Karamu.
Myrtus bullata, native name Ramarama.
Myrtus pedunculata.
Melicope ternata, native name Tataka.
Piper excelsum, native name Kawa-kawa.
Drimys axillaris, native name Horopito.
Weinmannia racemosa, native name Tawhero.
Fagus fusca, native name Tawhai.
Fagus Solandri, local name Black-heart birch.
Panax Edgerleyi, native name Raukawa.
Dacrydium cupressinum, native name Rimu.
Myoporum lætum, native name Ngaio.
Carpodetus serratus, native name Piripiriwhata.
Aristotelia racemosa, native name Mako.
Melicytus ramiflorus, native name Mahoe.
Olearia Traversii, native name Ake.
Senecio Huntii.
Hedera crassifolia, native name Oho.
Myrsine chathamica, native name Matipo.
Korokia buddleoides, native name Korokiataranga.
Veronica Forsteri, native name Koromiko.
Coprosma propinqua, native name Karamu.
Dracophyllum urvilleanum.

South Island—
Melicytus ramiflorus (Hina-hina, Whitewood or Mahoe).
Pittosporum tenuifolium (Black Mapau or Tarata).
Pittosporum eugenioides (White Mapau).
Pittosporum (New species).
Plagianthus betulinus (Ribbonwood).
Plagianthus Lyallii (Alpine Ribbonwood).
Elæocarpus Hookerianus (Pokako).
Elæocarpus dentatus, var. (Hinau).
Aristotelia racemosa, var. (Mako).
Pennantia corymbosa (Kaiko-mako or Ribbonwood)
Discaria Toumatou (Wild Irishman).
Alectryon excelsum (Titoki).
Sophora tetraptera (Kowhai, Goai).
Carpodetus serratus (Oak, White Matipo).
Weinmannia racemosa (Kamahi, Towhai).
Leptospermum scoparium (Manuka).
Metrosideros lucida (Rata).
Fuchsia excorticata (Konini, Fuchsia).
Fuchsia excorticata.
Panax crassifolium (Lancewood).
Panax crassifolium, varieties (Horoeka, Lancewood).
Panax Colensoi (Ivy tree).
Panax Edgerleyi (Rakawa).
Panax crassifolium (Lancewood).
Griselinia littoralis (Broadleaf).
Coprosma linearifolia (Mikimiki).
Olearia Forsteri (Ake-ake).
Olearia ilicifolia, holly (Ake-ake).
Dracophyllum Traversii (Nei-nei).
Myrsine Urvillei (Red Mapau).
Myoporum lætum (Ngaio).
Fagus fusca (Large-leaved birch).

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South Island—*cont.*
Epicarpurus microphyllus (Milk tree).
Epicarpurus microphyllus (Milk tree).
Libocedrus Bidwilli (Kawaka, Cedar).
Podocarpus ferruginea (Miro).
Podocarpus nivalis (Mountain Totara).
Dacrydium cupressinum (Rimu, Red pine).
Dacrydium Colensoi (Yellow pine).
Phyllocladus alpinus (Toa-toa).
Pennantia corymbosa (Kaiko-mako).
Panax species.
Plagianthus betulinus (Ribbonwood).

Timber.

James Halyday—
Board of Kauri (Dammara australis), polished.
Board of Mottled Kauri (Dammara australis, var.), polished.

Wood Sections in the round.

1. Tawai, Weinmannia silvicola.
2. Tawari, Ixerba brexioides.
3. Southern Rata, Metrosideros lucida.
4. Puriri, Vitex littoralis.
5. Quintinia serrata.
6. Small Rimu, Dacrydium, nov. sp.
7. Toatoa, Phyllocladus glauca.
8. Northern Rata, Metrosideros robusta.
9. Raukawa, Panax Edgerleyi.
10. Mangrove, Avicennia tomentosa. Furnishes potash in large quantity.
11. Toro, Persoonia Toro.

MANUFACTURES.

Reeves and Company, Dunedin—
Cordials and wines, assorted specimens, manufactured by exhibitors.
New Zealand Distillery Company, Dunedin—
One case assorted spirits.
Auckland Distillery—
One case of spirits.
Whitson and Sons—
Two cases of ales.
M. Ehenfield, Auckland—
One case of ales.
Maurice Joel, Dunedin—
One half-hogshead of colonial ale.
James Smith, Nelson—
One case fruit wines.
J. Gilmore, Christchurch, Canterbury—
Specimen of cured provisions: four hams, four sides of bacon.
Canterbury Meat Preserving Company—
Assorted samples of preserved meats.
A. Dornwell, Auckland—
Four cases of preserved meats: tongues, sausages, &c.
New Zealand Agricultural Society, Auckland—
Cheese, manufactured by H. Andrews.
C. Knight, Nelson—
One cheese.
T. Fish, Auckland—
One case extract of sarsaparilla.

Austin and Kirk, Christchurch—
Four flower pots.—Five drain pipes.—One garden border.—Three pickle jars, large and small floor tiles, fire bricks, common pressed bricks, all made from Malvern Hills fireclay, Canterbury.

A. J. Burns and Company, Mosgiel, Otago—
Sundry exhibits of goods manufactured by the exhibitors at the Mosgiel woollen mills, Otago:—1 blanket, No. 100, 10–4, 11½ lbs.—Plaiding No. D59, five yards.—Do., No. A158, do.—Do., No. D102, do.—Do., No. D113, do.—Do., No. D120, do.—Tweed, No. A363, do.—Do., No. J385, do.—Do., No. A342, do.—Do., No. D388, do.—Do., No. B390, do.—Do., No. D429, do.—Do., No. B311, do.—Do., No. J404, do.—Do., No. D439, 12 yards.—Do., No. A451, do.—Do., No. A457, do.—One undershirt, coloured, size 00.—One do., white, size 00.—One do., serge.—One do. do., silk mounted.—One pair pants, coloured, size 00.—One do. do., ribbed, size 000.—One do. do., white, size $\frac{0}{0}$.—One do. drawers, white serge.—One do. do. do., silk mounted.—One do., ladies drawers.—One do. do, silk mounted.—One plaid, No. 41, 7 lbs.—Tweed do. A458, 12 yards.—Do., No. C459, do.—Do, No. D460, do.—Do., No. B461, do.—Do., No. E462, do.—Do., No. 499, do.—Yarn, No. 18, priest grey, two cuts.—Do., No. 20, dark brown, do.—Do., No. 17, medium grey, do.—Do., No. 16, light grey do.—Do., No. 19, light brown, do.—Do., No. 21, white do.—Fingering yarn, No. 22, white do.—Do., No. 23, light brown, four cuts.—Do., No. 24, light grey do.—Socks, size $\frac{0}{0}$, one pair.—Do., size $\frac{00}{00}$, one pair do, size, $\frac{0}{0}$, 1 pair.—Do., size 0, 1 pair.—do. size $\frac{0}{0}$, one pair.—Do, size 00, one pair.—Stockings, white, size, 00, one pair.—Do., children's size, 00, 1 pair.—Do., coloured, size, 00, 1 pair.

Webley Brothers, Nelson—
Samples of tweeds, manufactured by exhibitors:—No. 73, at 14½ yards at 5*s.* 3*d.*—No. 55, 26½ yards at 5*s.* 3*d.*—No. 57, 16½ yards: at 5*s.* 3*d.*—No. 10, 25¾ yards at 5*s.* 3*d.*—No. 25, 21 yards at 5*s.* 3*d.*—No. 40, 25¼ yards at 5*s.* 3*d.*—No. 101, 21½ yards at 5*s.* 3*d.*—No. 69, 26¾ yards at 5*s.* 3*d.*—No. 79, 20½ yards at 4*s.* 9*d.*—No. 89, 18¼ yards at 4*s.* 9*d.*
Also a bale sent from Wellington, contents unknown.

T. Wilson, Heathcote Tannery, Canterbury—
Samples colonial leather.—Harness makers leather: One side black harness leather, one side brown harness leather, one side bridle leather, one side bag leather, one side belt leather, two pig skins (coloured), two pig skins (plain). Shoemakers leather: Two crop butts, basils (plain), two strained basils (can be supplied at 16*s.* per dozen), two soft basils (can be supplied at 14*s.* per dozen), two lining basils (can be supplied at 16 per dozen), and 10 basils (coloured), can be supplied at 36*s.* per dozen. All manufactured by exhibitor.

Thomas Wilson, Heathcote, Canterbury—
11 coloured lambskin mats.—One white lambskin mat.

Bœnicke, Kaikora glue works, Otago—
One case glue, manufactured by exhibitor.

McLeod, Robinson, and McLeod, Otago—
Two cases toilet and household soap, manufactured by exhibitors.

JEWELLERY.

Kohn and Sons, Auckland—
Greenstone and quartz jewellery, colonial made:—Three sets brooch and earrings, greenstone or jade and gold quartz inlaid.—One set brooch and earrings, carnelian inlaid.—Six single greenstone drops.—Four greenstone and quartz for brooches.—Two greenstone books and one greenstone heart.—Three greenstone brooch stones.—Three pairs greenstone earrings.—Three greenstone Maltese crosses.—One set greenstone sleeve-links.—One set quartz, six pieces.—One set quartz, greenstone inlaid.—One set greenstones.—Four stones for pins.—Two sets quartz brooch and earrings, gold mounted.—One pair quartz earrings.—One set quartz solitaires and studs, six pieces.—One set greenstone solitaires and studs, six pieces.—Two greenstone and quartz brooches.—Three greenstone

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lockets.—Six greenstone brooches and earrings.—Two pairs greenstone earrings.—Two greenstone brooches.—11 greenstone crosses.—Two green stone Maltese crosses.—Three greenstone hearts.—One greenstone locket Two greenstone books.—Six greenstone Albert chain drops.—One piece greenstone in natural state.

FINE ARTS.

Photographs by D. L. Mundy—

Mostly consisting of North Island scenery.

1. Patuka, or store house, at Waihi, head of Lake Taupo.
2. A digger's home, Ponga Flat, Thames Gold Fields.
3. Wellington, from the Cemetery.
4. Government House, Wellington.
5. River bed scene on the Waipawa River, Poverty Bay.
6. Flax mills at Hokianga Heads.
7. A geological study at Opoke, Hokianga, on the sea shore (measures 40 feet round).
8. Carved panel from the Maori house, Colonial Museum, Wellington.
9. Victoria, Bay of Islands, where the treaty of Waitangi was signed in 1842.
10. Momona bay, Kawau, the island home of Sir George Grey, K.C.B.
11. Kororareka, or Russell, Bay of Islands.
12. Study of a flax bush (Phormium tenax) on the Waikiri River, Hokianga.
13. The interior of a native pa at Kaitereria, Rotokakahi.
14. Teheki, head of the Waima River, Hokianga.
15. The great fern trees of New Zealand at Onoke, Hokianga (40 feet in height).
16. A forest scene, showing the Nikau palms at Onoke, Hokianga.
17. A study of the Great Mamuka or Ponga tree fern, on Ponga Flat, 1,200 feet above the Thames gold fields, the River Thames in the distance.
18. Ohinemutu Rotorua—the commencement of the Hot Springs district, with native village or Kainga.
19. Rotokakahi, near Rotomahana.
20. Roto Tarawera, near Rotomahana.
21. Tokanui, head of Lake Taupo, showing the Geysers.
22. Roto Pounamu, Rotomahana, or Cold Green Lake, showing the steam holes in the Hot Taupes.
23. Fumaroles, or boiling mud cones, Rotomahana.
24. General view of Rotomahana, looking east.
25. General view of Rotomahana, looking west.
26. The Te Tarata Geyser, Rotomahana.
27. The Otukapuarangi or Pink Terrace, Rotomahana.
28. Side view of the Te Tarata Terraces, Rotomahana.
29. Side view of the Pink Terrace, Rotomahana, showing the great stalactite terraces.
30. The Te Tarata Terrace, Rotomahana, looking down on the lake from the crater.
31. The crystal slope of the Te Kiwi Geyser, Rotomahana.
32. Captain Cook's Bay, where he took the transit of Mercury, November 9th, 1769.
33. Cabbage tree palms, Governors Bay, Canterbury.
34. Dyer's Pass Road, head of Lyttelton harbour.
35. Government Buildings, Christchurch, Canterbury.
36. Craigieburn Cutting, West Coast Road, Canterbury.
37. Study on the Otira River, Southern Alps, Canterbury.
38. The Bealey River bed, Canterbury.
39. The Rolleston Range, with glacier, Arthur's Pass, Canterbury.
40. Summit of Arthur's Pass, Westland, looking west.
41. Summit of Arthur's Pass, Westland, looking east.

42. Looking through the forest on the Teremakau River.
43. On the Teremakau River bed, Westland.
44. In the Kahikatea, or White Pine Forest, Westland.
45. An hotel on the gold fields, near Fox's diggings, Westland.
46. White Pine Forest, West Coast Road, Canterbury.
47. Thames gold field, from top of Moanataiari tramway, 1,200 feet above the sea.
48. Akaroa Bay, Banks' Peninsula, Canterbury.

W. Collie, of Marlborough—Photographs:—
49. Scenery of the Wairau Massacre.
50. Ditto ditto.
51. Ditto ditto.
52. White's Bay, landing place of Cook Strait telegraph cable.
53. Flax mills and bleaching ground, Massacre Hill, province of Marlborough.
54. Picton (evening), province of Marlborough.
55. Massacre Hill, province of Marlborough, wild Phormium in foreground.
56. Monument at the graves on Massacre Hill.

W. T. L. Travers—
12 Photographs of New Zealand scenery:
Lake Guyon and Creek scenes, Nelson Province, South Island.

W. N. Blair, C.E.—
3 Photographs, Rangitata Bridge, Canterbury.

General Government—
Photographs of Thames Gold Fields, Auckland, by Bishop:
1. Golden Calf and Central Italy Mines, Moanataiari Creek.
2. Victoria and Morning Star Batteries.
3. Imperial Crown, Torkey's and United Pumping Company.
4. Caledonian Mine, Moanataiari Creek; gold obtained 680,000*l.*
5. View of Grahamstown, Thames, looking south.
6. Brown and Campbell's Battery, Tararu Creek.
7. Ditto ditto looking seaward.
8. Tararu Tramway, looking down.
9. Ditto ditto up.
10. Caledonian Battery.
10a. Inside view of battery stampers.
10b. Ditto of berdans.
11. Three views of united pumping machines.
11a. Interior of engine room—valve gear.
11b. Ditto view of cataract gear.

MISCELLANEOUS.

Luke Nattrass, Nelson—
Sketch to exhibit the use of a new pigment chemically extracted from the Hinau tree (Elœocarpus). A specimen of this has been exposed to the light for seven years without showing any change or fading.

R. Walker & Co., Auckland—
Exhibits of Kauri gum.

Combes and Daldy, Auckland—
Four cases of Kauri gum. Samples from bulk sent to London.

Brown and Campbell, Auckland—
Kauri gum, as assorted for the London market. Nos. 1, 2, and 3.

Owen and Graham, Auckland—
Kauri gum, as assorted for the London market. Nos. 1, 2, and 3.

Henderson and Macfarlane, Auckland—
Kauri gum, as assorted for the London market. Nos. 1, 2, 3, and 4.

R. Nager, Raglan, Auckland—
Fungus (Hirneola polytricha), used as food by the Chinese. Largely exported from the colony.

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Auckland Museum—
Footprint of Moa, from Poverty Bay, Auckland.

T. L. White, Auckland—
Inlaid cabinet, made of New Zealand woods, especially comprising kinds peculiar to the North Island. Made by Seuffert. Price 100*l.*

G. Holdship and Company, Auckland—
One 2-inch moulded and panelled door, one 1½-inch ditto, two pairs of sashes, one case of mouldings.

General Government—
Table made of mottled Kauri.
Kowharra (leaves of Astelia). A first-class material for the manufacture of paper.

D. Nairn, Christchurch—
Six varieties of silk; the yellow silk is Chinese, the white silk is Indian, the small sample is Japanese; showing the new process of drying in the sun for export. Grown and dried by exhibitor.

Miss Emily George, Taranaki—
Exhibit of silk.

Dr. Haast, F.R.S., Canterbury Museum—
1. Geological section of the Moorhouse Tunnel through the Caldera wall of Lyttelton Harbour, Banks' Peninsula, province of Canterbury. Scale horizontal and vertical, 200 feet to 1 inch.
2. Geological detail section of the Moorhouse Tunnel, on the Lyttelton and Christchurch Railway, Canterbury. Scale horizontal and vertical, 20 feet to 1 inch. Engineering details by Edward Dobson, C.E., Provincial Engineer.
3. Reconnaissance map of the interior of the province of Canterbury (the southern Alps). Scale 4 miles to 1 inch.
4. Geological map of the Malvern Hills, Canterbury. Scale 1 mile to 1 inch.

General Government—
Map of Thames Gold Field, 14 feet by 7 feet.
Panorama of the Thames Gold Field, as seen from the sea, 15 feet by 2 feet.

Dr. Haast, F.R.S., Canterbury Museum—
Skeletons of Moas—(1) Dinornis giganteus, (2) Dinornis didiformis, (3) Palapteryx elephantopus.
Case of New Zealand birds:
1 Circus assimilis, Harrier, Kahu.
2 Halcyon sanctus, Kingfisher, Kotare.
2 Prosthemadera novæ-zealandiæ, Parson Bird, Tui.
2 Anthornis melanura, Bell Bird or Mocker, Mokomoko.
2 Zosterops lateralis, Blight Bird or White Eye, Tauhoe.
2 Acanthisitta chloris, Creeper, Titipounamu.
2 Orthonyx ochrocephala, Canary or Yellow Head, Popokatea.
2 Petroica albifrons, Wood Robin.
2 Certhiparus novæ-zealandiæ, Brown Creeper, Toitoi.
2 Rhipidura tristis, Black Fantail, Tiwakawaka.
2 Glaucopis cinerea, Orange-wattled Crow.
1 Stringops habroptilus, Ground Parrot, Kalapo.
1 Platycercus novæ-zealandiæ, Crimson-top Paroquet, Kakariki.
2 Platycercus auriceps, Yellow-top Paroquet, Kakariki.
2 Carpophaga novæ-zealandiæ, Wood Pigeon, Kereru or Kuku.
1 Apteryx australis, Brown Kiwi or Rowi.
2 Apteryx oweni, Gray Kiwi.
2 Charadrius obscurus, Red-breasted Plover, Tuturi-whata.
2 Charadrius bicinctus, Dotterel, Pohowera.
2 Anarhynchus frontalis, Crook-bill Plover.
2 Hæmatopus longirostris, Pied Oyster-catcher, or Red-bill, Torea.
2 Hæmatopus leucocephalus, Pied Stilt, Poaka.
2 Himantopus melas, Black stilt.
2 Porphyrio melanotus, Swamp Hen, Pukeko.
2 Casarca variegata, Paradise Duck, Putangitangi.

1 Anas superciliosa, Grey Duck, Parera.
1 Fuligula novæ-zealandiæ, Black Teal, Papango.
1 Rhyncaspis variegata, Shoveller Duck.
1 Larus dominicanus, Black-backed Gull, Karoro.
1 Larus melanorhynchus, Black-billed Gull.
1 Sterna frontalis, Sea Swallow, Tara.
2 Sterna antarctic, Common Tern.
2 Sterna nereis, Little Tern.
2 Graculus punctatus, Spotted Shag, Kawau.
2 Rhipidura flabellifera, Pied Fantail, Piwakawaka.

Colonial Museum—

Tan Barks, native to New Zealand:

Wood of Fuchsia excorticata, native name Kotukutuku; percentage of tannin, 5·3.

Bark of Eugenia maire, native name Whawhako; percentage of tannin, 16·7.

Bark of Elæocarpus Hookerianus, native name Pokako; percentage of tannin, 9·8.

Bark of Coriaria ruscifolia, native name Tutu; percentage of tannin, 16·8.

Bark of Knightia excelsa, native name Rewarewa; percentage of tannin, 2·7.

Bark of Elæocarpus dentatus, native name Kiri-Hinau; percentage of tannin, 21·8.

Bark of Weinmannia racemosa, native name Tawheri; percentage of tannin, 12·7.

Bark of Myrsine Urvillei, native name Mapau; percentage of tannin, 1·4.

Bark of Phyllocladus trichomanoides, native name Kiri-Toa-Toa; percentage of tannin, 23·2.

Bark of Hoheria populnea, var. augustifolia.

Hirneola auricula-Judæ, Ear fungus; exported largely to China by Chinese emigrants.

Leaves of Celmisia coriacea, native name Tikapu; hills of South Island.

W. S. Grayling, Taranaki—

Two samples of extracts of Hinau and Towai:

The Hinau is a large forest tree, abundantly diffused throughout most parts of New Zealand. The bark has been successfully used in tanning operations. The natives also use it in producing the beautiful black dye for their flax work; for which purpose the bark is first bruised, and boiled for a short time. When cold, the flax is put into the mixture, where it is left for two days, after which it is taken out and steeped thoroughly for two days in red swamp mud, rich in peroxide of iron, when it is removed and dried in the sun. The Hinau can be used in the manufacture of ink, by dissolving a small quantity of the extract in water, and adding a little rust of iron. As it contains neither corrosive acid nor gum, the pen is neither injured nor clogged. The extract of Hinau can also be used instead of logwood.

The extract of Towai is much more astringent than that of Hinau, and needs only to be introduced to be accepted by tanners.

MANUFACTURES OF PHORMIUM TENAX.

New Zealand Flax.

Cornelius Thorne, London—

1. Coarse and fine leaves of the phormium (New Zealand flax). Plant grown in New Zealand.

2 and 3. Fibre extracted from coarse and fine leaves of the Phormium plant (New Zealand flax), by Cornelius Thorne, London.

4. Rope made by Messrs. Frost Brothers, London, for Cornelius Thorne, London, from the Phormium fibre (New Zealand flax) prepared by him.

5. Rope, made by Messrs. Frost Brothers, London, for Cornelius Thorne, London, from the Phormium fibre (New Zealand flax) prepared by him.

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This rope was used in taking on board the complete cargoes of Messrs. J. Willis & Sons' ships, the "White Adder," the "Black Adder," and the "Cutty Sark."

6. Box cord and string, manufactured from Phormium fibre (New Zealand flax) prepared by Cornelius Thorne, London.
7. Cloth, adapted for corn sacks, wool packs, &c., manufactured for Cornelius Thorne, London, from the long tow of the Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (1 bolt 30 yards 28 inches wide).
8. Hessian cloth, manufactured by Messrs. E. Parker & Co., Dundee, for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Abroath, Scotland.
9. Canvas, manufactured by Messrs. John Walker & Co., Stanley Works, Arbroath, Scotland, for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill; Arbroath, Scotland (1 bolt 40 yards).
10. Unbleached twilled sheeting, manufactured for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (28½ yards 36 inches wide).
11. Bleached twilled sheeting, manufactured for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (23 yards 36 inches wide).
12. Unbleached twill cloth, manufactured for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (27½ yards).
13. Bleached twill cloth, manufactured for Cornelius Thorne, London, from Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (15 yards).
14. Unbleached canvas, manufactured by Messrs. E. Parker & Co., Dundee, for Cornelius Thorne, London, from a mixture of 25 per cent. Phormium fibre (New Zealand flax) and 75 per cent. Riga flax. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland.
15. Bleached canvas, manufactured by Messrs. E. Parker & Co., Dundee, for Cornelius Thorne, London, from a mixture of 25 per cent. Phormium fibre (New Zealand flax) and 75 per cent. Riga flax. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (10 yards).
16. Light sacking, manufactured for Cornelius Thorne, London, from the tow of the Phormium fibre (New Zealand flax) prepared by him. The yarn spun by A. K. Forbes, Hatton Mill, Arbroath, Scotland (1 bolt 37 yards 28 inches wide).
17. Two damask table cloths, manufactured for Cornelius Thorne, London, from native-dressed Phormium fibre (New Zealand flax), by Messrs. D. Lornie and Sons, Kirkcaldy, Scotland. These cloths have unfortunately been damaged, and time did not allow of their being replaced (1 washed, 1 fully dressed).

N. T. Lockhart—

18. Samples of net twine, cord, seaming twine, roping twine, herring nets, salmon nets, yarns of various sizes, and dressed flax. All manufactured from native-dressed Phormium fibre (New Zealand flax). Dressed by N. T. Lockhart, of Bennochy Works, Kirkcaldy, Scotland.

No. 1.

Six pieces No. 6, 2 ply (or two thread) net twine, spun 3 lb. yarn per spindle.

Two pieces No. 7, 2 ply (or two thread) net twine, spun from 3½ lb. yarn per spindle.

One piece No. 12, 2 ply (or two thread) net twine, spun from 6 lb. yarn per spindle.

No. 2.

Three pieces No. 5, 3 ply (or three thread) net twine, spun from 2½ lb. yarn per spindle.

N. T. Lockhart.—*cont.*

One piece No. 6, 3 ply (or three thread) net twine, spun from 3 lb. yarn per spindle.

Two pieces No. 8, 3 ply (or three thread) net twine, spun from 4 lb. yarn per spindle.

Four pieces No. 12, 3 ply (or three thread) net twine, spun from 6 lb. yarn per spindle.

NOTE.—Ply is Scotch for cord or fold; for instance, 2 ply means two threads, 3 ply three threads, and so on.

No. 3.

Three pieces line polished, 6½ lb. yarn per spindle.

Two pieces 3 ply salmon net twine.

One piece marine cable, *i.e.*, yarn to wind round marine cable.

Five pieces cord or twine.

No. 4.

Two pieces 3 ply seaming twine or sail twine.

Two pieces 5 ply roping twine for sails, used for securing ropes to the canvas.

No. 5.

Five pieces 15 score 34 rows, 1 ply or single yarn fishing net.

Four pieces 15 score 34 rows 2 ply herring nets.

Four pieces 18 score 34 rows 3 ply herring net.

Four pieces, 2¼ inch salmon nets, 3 ply, 2¼ inch the size of the mesh.

Four pieces, 3¼ inch salmon nets, 3 ply, 2¼ inch the size of the mesh.

NOTE.—Salmon nets are of various size of mesh.

No. 6.

Ten bales 2 ply twine or two threads.

No. 7.

Four bales 2½ lbs. flax yarn.

NOTE.—One spindle of yarn measures 14,400 yards. Forty-eight leasor leas, 1 spindle. Example, 24 lea yarn would be 2 lb. per spindle.

All fishing nets (salmon excepted) are counted by scores, rows, and weight; for instance—

Ten score net is 200 meshes deep.

Fifteen score net is 300 meshes deep.

Eighteen score net is 360 meshes deep.

19. Dice-pattern table cloth, unbleached and bleached. Damask towelling, unbleached and bleached, manufactured from a linen yarn warp, and a Phormium fibre (New Zealand flax) yarn, woven for the Agent-General for New Zealand by Mr. N. T. Lockhart, of Bennochy Works, Kirkcaldy, Scotland.

20. Stair carpeting, manufactured from the tow of the native-dressed Phormium fibre (New Zealand flax) for the Agent-General for New Zealand by Mr. N. T. Lockhart, Bennochy Works, Kirkcaldy, Scotland.

Nets, twines, &c., manufactured from the "Phormium fibre" (New Zealand flax).

Agent-General of New Zealand—

21. Sample bale of machine-dressed Phormium (ex "Halcione"), produced by the Cape Egmont Flax Company at their mills at Opunake, and sent to England for broker's report. (Valued at 45*l.* per ton.)

22. Coils of rope and twine of various sizes, made of New Zealand Phormium.

23. Scotch twilled sheeting—coarse linen—damask towelling, manufactured from the native-dressed Phormium fibre by Mr. A. K. Forbes, Hatton Mill, Arbroath, Scotland.

24. Mail bags, manufactured from the tow of the Phormium fibre (native dressed) by Mr. A. K. Forbes, Hatton Mill, Arbroath, Scotland.

25. Maori robes (Kaitaka and Korowai), manufactured from hand-dressed Phormium fibre.

26. Feather robe (Kahu Kereru), formed by plaited Phormium fibre, overlaid with pigeon and parrot feathers.

Fancy baskets, made by Maori women.

Nets, twine, &c., manufactured from the Phormium fibre.

NEW ZEALAND.

FINE ARTS.

Water Colours, Drawings, and Photographs.

H. S. H. Jones, C. B.:—

1. View of the Southern Alps, from the sea off Greymouth, West Coast, Middle Island. By J. Gully.
2 and 3. Views of Mount Cook and Range, 13,800 feet, morning light looking east, with a lagoon in the foreground.
Sunset light looking west, the Wai-au River in the middle distance. Both by J. Gully.
4. View of Peak of Mount Cook, 7 or 8 miles distant, taken from above the Glaciers, dimly seen far below. By J. Gully.
5. Mountain scene in Nelson Province. By J. Gully.
6. Mount Egmont and Middle Range, in Taranaki Province. By J. Gully.
7. Scene from the road to Dunedin from Port Chalmers, Otago, looking over the harbour. By. C. D. Barraud.
8. Forest scene with tree ferns on the Ngauranga Road, Wellington, North Island. By C. D. Barraud.
9. Photographs of the Hot Springs, Rotomahana. 1 large and 4 small.
6 large ditto of forest scenes, Auckland. By the Rev. J. Kinder.
7 large ditto Wangarei scenery (2 coloured). By Bartlett, Auckland.

Alexander Brogden, M.P.:—

10. Landscape, in water colours (7 feet by 5). By J. Gully. View of the Waimea Country, in the Nelson Province, South Island.

Falconer Larkworthy:—

11. Painting by Gully, representing a part of Blind Bay, in the Province of Nelson, as seen from one of the neighbouring hills.
12. Painting by Gully, representing Sunset, on the ranges that divide the Wairoa River from Rotoiti. The rivers Buller, Wairau, Motueka, Motupiko, and Clarence, are said to take their rise at this spot.
13. Painting by C. D. Barraud (of Wellington), representing a portion of Carnarvon Estate, in the Lower Rangitikei district, Province of Wellington, New Zealand.
14. Painting by C. D. Barraud, representing the Makowai Stream on Carnarvon Estate.

Walter L. Buller, Sc. D., F.L.S.:—

15. A History of the Birds of New Zealand (royal quarto, 400 pp., with 35 hand-coloured illustrations.) By the Exhibitor.
16. Representation of Dinornis giganteus, the extinct wingless bird of New Zealand. "Moa" of the natives.
17. Photograph of the leg bones of Dinornis maximus.

J. Crombie.

18. Series of photographs (coloured and uncoloured), illustrative of Auckland and its suburbs.

James Brogden—

Four views of New Zealand scenery (in water colours). By C. D. Barraud.

Pictorial Series.

W. Lauder Lindsay, M.D., F.R.S.E.—

5 framed photographs.
1 framed ditto.
6 panoramic views.
14 drawings and sketches.
17 geological and other maps.

ORNITHOLOGICAL COLLECTIONS.

Falconer Larkworthy—

2 specimens of the Ground Parrot of New Zealand (Stringops habroptilus). "Kakapo" of the natives.
1 specimen of the North Island Kiwi (Apteryx Mantelli).

Alfred Eccles, F.R.C.S.—

2 specimens of the Grey Kiwi (Apteryx Owenï).

James Brogden—
Extensive collection of birds, classified and named in conformity with Dr. Buller's "Birds of New Zealand."

List of Species.

Fam. Falconidæ—
Circus Gouldi (2 specimens). Gould's Harrier, Kahu and Manutahae of the natives.
Fam. Strigidæ—
Spiloglaux Novæ Zealandiæ. "Morepork," Ruru, or Peho.
Fam. Trichoglossidæ—
Nestor meridionalis (4 specimens). The Kaka Parrot.
Fam. Platycercidæ—
Platycercus Novæ Zealandiæ (2 specimens). Red-fronted Parrakeet. Kakariki.
Platycercus alpinus (3 specimens). Smaller yellow-fronted Parrakeet.
Fam. Alcedinidæ—
Halcyon vagans (3 specimens). New Zealand Kingfisher. Kotare.
Fam. Cuculidæ—
Chrysococcyx lucidus (2 specimens). Bronze or shining Cuckoo. Warauroa or Pipiwarauroa.
Fam. Meliphagidæ—
Zosterops lateralis (8 specimens). The Silver-eye. Tauhou, Kanohi-mowhiti, or Iringatau.
Prosthemadera Novæ Zealandiæ. Parson Bird. Tui and Koko.
Anthornis melanura (3 specimens). Korimako, or Makomako.
Fam. Certhiidæ—
Orthonyx albicilla (5 specimens). Popokatea.
Fam. Paridæ—
Certhiparus Novæ Zealandiæ (6 specimens). Pipipi, or Toitoi.
Fam. Sylviidæ—
Gerygone flaviventris (3 specimens). Riroriro, or Komiromiro.
Acanthisitta chloris. The Rifleman. Tititipounamu, Moutuutu, Kikirimutu, or Tokepiripiri.
Xenicus longipes. Bush Wren. Matuhituhi, Piwauwau, or Hurupounamu.
Miro longipes (2 specimens). North Island Robin. Pitoitoi, or Toutouwai.
Miro albifrons (3 specimens). South Island Robin.
Myiomoira macrocephala (7 specimens). Yellow-breasted Tit. Miromiro, or Ngirungiru.
Myiomoira toitoi (2 specimens). Pied Tit.
Sphenœacus punctatus. Common Utick, Matata, or Koroatito.
Fam. Motacillidæ—
Anthus Novæ Zealandiæ (3 specimens): New Zealand Pipit. Pihoihoi, or Whioi.
Fam. Muscicapidæ—
Rhipidura flabellifera (3 specimens). Pied Fantail. Tiwaiwaka, or Piwakawaka.
Rhipidura fuliginosa. Black Fantail (South Island).
Fam. Sturnidæ—
Heteralocha acutirostris (2 specimens). Huia. Very rare.
Fam. Corvidæ—
Glaucopis Wilsoni. Blue-wattled Crow. Kokako.
Glaucopis cinerea. Orange-wattled Crow. (South Island.)
Fam. Columbidæ—
Carpophaga Novæ Zealandiæ. New Zealand Pigeon. Kereru, or Kukupa.
Fam. Rallidæ—
Ocydromus Earli. (3 specimens). North Island Wood Hen. Weka.
Ocydromus Australis. (3 specimens). South Island Woodhen.
Rallus Philippensis. Striped Rail. Patatai, or Mohopereru.
Ortygometra affinis. Water Crake. Koitareke.
Porphyrio melanotus. (4 specimens). Swamp Hen. Pukeko.

NEW ZEALAND.

Fam. Scolopacidæ—
Limosa Baueri (2 specimens). Barred-rumped Goodwit. Kuaka.
Himantopus leucocephalus. White-headed Stilt. Turuwatu.
Himantopus Novæ Zealandiæ (2 specimens). Black Stilt. Kaki.
Recurvirostra Novæ Hollandiæ. Red-necked Avocet. (Rare in New Zealand.)

Fam. Charadriidæ—
Charadrius obscurus. New Zealand Dottrel. Tuturiwhata.
Charadrius bicinctus (5 specimens). Banded Dottrel. Pohowera.
Thinornis Novæ Zealandiæ. New Zealand Sand Plover. Tuturuatu. Very rare.
Anarhynchus frontalis (4 specimens). The Wry-billed Plover.

Fam. Ardeidæ—
Botaurus pœciloptilus (2 specimens). New Zealand Black-backed Bittern. Matukuhurepo.

Fam. Anatidæ—
Casarca variegata (9 specimens). The Paradise Duck. Putangitangi.
Anas superciliosa (2 specimens). The Grey Duck. Parera-maori.
Spatula variegata. New Zealand Shoveller, or Spoonbill Duck. Weta-wetangu, or Kuruwhengi.
Hymenolæmus malacorhynchus (5 specimens.) Blue Duck. Wio.
Fuligula Novæ Zealandiæ. New Zealand Scaup. "Black Teal" of the of the colonists. Papango, or Matapouri.
Anas chlorotis (2 specimens). Brown Duck. Tarawhatu, or Pateke.

Fam. Laridæ—
Larus dominicanus (2 specimens). Southern Black-backed Gull. Karoro.
Sterna frontalis (3 specimens). White-fronted Tern. "Sea Swallow" of the colonists. Tara.

Fam. Procellariidæ—
Ossifraga gigantea. The Giant Petrel. "Nelly" of sailors.
Daption capensis. Cape Petrel.
Prion turtur. Dove Petrel. Whiroia.
Prion vittatus. Broad-billed Dove Petrel.
Puffinus tristis. The Sombre Shearwater.
Thalassidroma nereis. The Grey-backed Storm Petrel.

Fam. Pelecanidæ—
Phalacrocorax Novæ Hollandiæ (5 specimens). Black Sea Shag. Kawau.
Phalacrocorax varius (2 specimens). Pied River Shag. Karuhiruhi.
Phalacrocorax brevirostris (3 specimens). White-throated Shag. Kawau-paka.
Phalacrocorax punctatus (2 specimens). Spotted Shag.

Fam. Spheniscidæ—
Endyptula minor. Blue Penguin. Korora.

Fam. Podicipidæ—
Podiceps rufipectus. New Zealand Dabchick, Weweia, or Totokipio.
Podiceps cristatus. Creat-crested Grebe.

Walter L. Buller, Sc. D., F.L.S.—
Collection of the Raptores, or Birds of Prey, inhabiting New Zealand (mounted by Burton), viz.:
1. Ichthyaëtus leucogaster, White-bellied Sea Eagle. (Straggler on the New Zealand coast). Unique specimen.
2. Hieracidea Novæ Zealandiæ. Quail-hawk "Karearea" and "Kare-warewa" of the natives.
3. Heiracidea brunnea. Bush-hawk. "Karewarewa-tara" of the natives.
4 and 5. Circus Gouldi. (Adult and young). The Marsh Harrier. "Kahu" of the natives.
6. Sceloglaux albifacies. Laughing Owl. "Whekau" of the natives.
7. Spiloglaux Novæ Zealandiæ. Morepork of the colonists. "Ruru" and "Peho" of the natives.

COLLECTION OF NEW ZEALAND WOODS.

Alfred Eccles, F.R.C.S.—
Collection of New Zealand timbers and ornamental woods, (polished and rough,) with descriptive list.
Agent-General for New Zealand—
Sections of Knotted Totara timber (Podocarpus Totara), used for ornamental cabinet work.

BOTANICAL SPECIMENS.

W. Lauder Lindsay, M.D., F.R.S.E.—
2 portfolios, containing 135 sheets of specimens and 15 engraved plates.

GEOLOGICAL SPECIMENS.

I. Geological Series—
50 bottles of specimens.
144 specimens in an equal number of trays.
1 Moa bone.

PRESERVED MEATS.

D. Tallerman—
Extensive collection of New Zealand preserved meats, in tins, &c.
Wanganui Beef-curing Company—
(Langley Smyth and Co., Wolverhampton, Agents.)
Samples of preserved beef and tongues, from the Wanganui and Patea pastures.

MISCELLANEOUS.

Agent-General for New Zealand—
Collection of Maori carvings. Specimens of native clubs.
Robert Graham—
Specimen of Maori carving.
Agent-General for New Zealand—
Rebel flag, worked in wool by Maori women (taken by H.M. forces during he West Coast campaign).
Agent-General for New Zealand—
Inlaid table of New Zealand woods (North Island.)
Walter L. Buller, Sc.D., F.L.S.—
Inlaid cabinet box, of exquisite design and workmanship (Seuffert), composed entirely of New Zealand woods.
Mrs. Henry Walton—
Extensive collection of New Zealand ferns.
Mrs. Walter Buller—
Muff and collaret, made of the skin and feathers of the spotted Kiwi of the South Island (Apteryx Oweni).

BUILDING STONES.

Agent of Canterbury Government—
Collection of building stones from Canterbury Province, classified and named by Dr. Haast.

QUEENSLAND.

CEREALS.

Wheat.

1. Mr. R. F. Walker, Highfields, Darling Downs, Egyptian.
2. Mr. W. Tulloch, Agricultural Reserve, Warwick, white.
3. Mr. James Wilson, Warwick, white.

Along with this sample of wheat Mr. Wilson furnished a statement of the cost of production. From this it appears that on rather less than 19 acres he raised 800 bushels of wheat, which realised 5*s.* 6*d.* per bushel. The whole cost connected with the crop, from ploughing to the final carriage of the grain to market, was 98*l.* 12*s.*, giving a net profit of 121*l.* 1*s.*

QUEENSLAND.

4. Mr. John Doyle, *Mogill*, East Moreton, red.
F. J. C. Wildash, Esquire, Canning Downs, 1 case wheat soil, from Killarney, 20 miles from Warwick.

Barley.

5. Mr. R. F. Walker, malting.
6. Mr. R. F. Walker, bearded.
7 and 8. Mr. R. F. Walker, yellow maize.

Flour.

Mr. James Kates, Allora, Darling Downs, wheaten, 50 lbs.
Mr. William Pettigrew, wheaten, 20 lbs.
Mr. William Pettigrew, maizena, 20 lbs.

ARROWROOT, ETC.

Botanic Garden—
1. West Indian white, Maranta arundinacea.
2. East Indian purple, Canna edulis.
3. Brazilian, Manihot utilissima.
4. Brazilian tapioca, Manihot utilissima.
5. Brazilian flour, Manihot utilissima.
6. Brazilian Cassava flour, Manihot janipha.

SUGARS.

Messrs. Mackenzie, Brothers, Gairloch, Lower Herbert River—
Situated in lat. 18° 37′; lon. 146° 10′.
1 bag of sugar, 56 lbs., marked "1 A."
1 box of soil, marked "1 A."
Made with steam clarifiers, flat battery, Wetzel pan and centrifugal. From Bourbon cane, 14 months old; average crop, 2½ tons per acre.

J. E. Davidson, Esq., Alexandra Plantation, Mackay—
Situated in lat. 21° 11′; lon. 149° 10′.
3 bags of sugar, 28 lbs. each. No. 1, 2, 3, of this year's crop.
No. 1, sample of 240 tons
No. 2, sample of 120 tons } Marked "B. 2."
No. 3, sample of 35 tons
Made up with steam clarifiers, open batteries, Gradsden pan and centrifugal, from Bourbon cane. Crop from 200 acres of land, 395 tons.
1 box of soil, marked "B. 2."

John Eaton, Esq., Eaton Vale, Maryborough—
Situated in lat. 25° 38′; lon. 152° 40′.
1 bag of sugar, 56 lbs., marked "E. 4."
Made by open process and Wetzel pan, dried in centrifugal.

Messrs. Ramsey Bros., Jindah Estate, Maryborough—
Situated in lat. 25° 30′; lon. 152° 41′.
1 bag of sugar, 56 lbs., marked "C. 5."
1 box of soil, marked "C. 5."
The sample of sugar is taken from 40 tons, made from 10 acres of two-years' old Bourbon cane, manufactured by the common process, viz., open battery and Wetzel pan.

A. H. Brown, Esq., Antigua Plantation, Maryborough—
Situated in lat. 25° 50′; lon. 152° 38′.
1 bag of sugar, 56 lbs., marked "A. 1 Antigua."

Messrs. Raff & Co., Morayfield, Caboolture.
Situated in lat. 27° 9′; lon. 153° 0′.
1 bag of sugar, 56 lbs., marked "R. R. 6."
1 box of soil, marked "R. R. 6."
Made from the black Cheriben cane rattoons. Evaporated in hemispherical pans to density of 20° Beaumé, and concentrated in open low temperature pans and centrifugated.

Messrs. James Johnston and Sons, Helenfield, Tingalpa—
Situated in lat. 27° 30′; lon. 153° 8′.
1 bag of sugar, 56 lbs., marked "7, Helenfield."
1 box of soil, marked "7, Helenfield."
The sample of sugar is the produce of 4 acres of the Chigaco cane, 11 months old, and yielded 1½ tons to the acre, and made by R. M. Johnston. The plant for manufacture is of the commonest description, having cost 1,300*l.* beyond their own labour. It consists of mill, two clarifiers, flat battery of four pans with iron tache and dipper. The liquor is reduced to about 26° Beaumé, in the tache, from whence it is skipped into a receiver; after subsiding a short time it is run into steam-pan, and finished. Said pan is heated by steam coil, the temperature being kept down to about 180° by lathed revolving drum.

The Honourable Louis Hope, Ormiston Plantation, Cleveland—
Situated in lat. 27° 30′; lon. 153° 16′.
1 bag of sugar, 56 lbs., marked "L. H. 8."
1 bag of sugar, 56 lbs., marked "Raw Sugar, L. H. 8."
1 box of soil, marked "L. H. 8."
Bag No. 8 made from a small yellow cane, name uncertain (a hairless variety), leaf with smooth edges, third cutting or second rattoons. Bag marked "raw sugar" from same cane, of first cutting, or plant 23 months old; steam clarifiers, open battery and Gradsden pan, the last a sample from 14 tons off 7 acres of ground; both from similar soil to that in case, and manured; both raw sugar dried in centrifugal.

Henry Jordan, Esq., Tygum, Logan River—
Situated in lat. 27° 45′; lon. 153° 7′.
1 box of sugar, 56 lbs., marked "J. 27."
1 box of soil, marked "J. 27."
The sample of sugar made from violet cane, two years old.

The Government Penal Establishment, St. Helena—
Situated in lat. 27° 24′; lon. 153° 15′.
1 bag of sugar, 56 lbs., marked "broad-arrow."
1 box of soil marked "broad-arrow."
Sample of sugar made from ribbon cane, 16 months old, yielding 2 tons to the acre; boiler, open battery.

Messrs. Fryar and Strachan, Loganholme, Logan River.
Situated in lat. 27° 42′; lon. 153° 14′.
1 bag of sugar, 56 lbs., marked "S. 10."
1 box of soil, marked "S. 10."

Philip H. Nind, Esq., Yahwalpa, Pimpama—
Situated in lat 27° 48′; lon. 153° 23′.
1 bag of sugar, 56 lbs., marked "N. 12."
1 box of soil, marked "N. 12."
Sample of sugar made from second rattoons, 18 months old.

Robert Muir, Esq., Berron, Nerang Creek—
Situated in lat. 28° 2′; lon. 153° 25′.
1 bag of sugar, 56 lbs., marked "M. 11."
1 box of soil, marked "M. 11."
Sugar made from ribbon cane rattoons, one year old; process of manufacture, common open pan battery.

Port Royal Mill, Bald Hills—
Situated in lat 27° 19′; lon. 152° 2′.
1 bag of sugar, 56 lbs., marked "G. 13."
Sample made from Bourbon cane; process of manufacture, common open Wetzel pan.

TEA AND COFFEE.

Botanic Garden—
Coffee, raw, 5 lbs.
Coffee, manufactured, 1 lb.
Tea, manufactured, ½ lb.

QUEENSLAND.

TOBACCO.

Mr. K. McLennan, Fortitude Valley—
2 cases of manufactured tobacco (21 lbs. each).
1 box of soil.
Mr. C. Chubb, Ipswich—
5 lbs. of Virginia leaf tobacco.
Mr. Hugh Mahony, Cunangra, Albert River—
5 lbs. of leaf tobacco.
Messrs. E. Marwedel & Co., Toowoomba—
5 lbs. of leaf tobacco.
Botanic Garden—
5 lbs. of Virginia leaf tobacco.

WINE.

Messrs. Meyer and Isambert, Ipswich—
One case (one dozen bottles).
Two bottles (vintage of 1869).

FIBRES.

Botanic Garden—
1. Queensland hemp, Sida retusa.
2. Queensland hemp (scutched), Sida retusa.
3. Queensland rope, Sida retusa.
4. Bowstring hemp, Sanseviera cylindrica.
5. Ceylon hemp, Sanseviera zeylanica.
6. Guinea hemp, Sanseviera guineensis.
7. Guinea hemp, Sanseviera latifolia.
8. Mexican hemp, Fourcroya gigantea.
9. Pete hemp, Agave americana.
10. Cuba hemp, Fourcroya cubensis.
11. Jute hemp, Corchorus capsularis.
12. Jute and pete hemp, Corchorus olitorius.
13. Bengal fibre, Crotalaria juncea.
14. Manilla hemp, Musa textilis.
15. Plantain hemp, Musa paradisiaca.
16. Rosella hemp, Hibiscus sorbifolia.
17. Hibiscus mutabilis.
18. Flax, Linum usitatissimum.

Mr. A. McPherson, Brisbane—
19. Hemp, Sterculia quadrifida.

Mr. Weise, Ipswich—
20. Queensland hemp, Sida retusa.

COTTON.

G. T. Lang, Brisbane—
1 bag of New Orleans, marked "21."
Botanic Garden—
1 bag of New Orleans, marked "22."

SILK COCOONS.

Mrs. Hine, Ipswich—
4 boxes containing four samples, viz., Two samples Japanese, two samples East Indian.
William Coote, Esq., Rocky Waterholes, Oxley—
1 case of cocoons.
A. H. Gardner, Esq., Sandgate—
1 parcel of cocoons.

DUGONG OIL.

L. Carmichael, Esq., Brisbane—
1 bottle.

MISCELLANEOUS.

L. Carmichael, Esq., Pharmaceutical chemist, Brisbane—
Ayapana bitters, Eupatorium ayapana.
Orange bitters, Citrus bigaradia.
Tincture, Petalostigma quadriloculare.
Tincture, Alstonia constricta.
Oil of lemon, Citrus limonum.
Oil of orange, Citrus bigaradia.
Essence of ginger, Zingiber officinalis.
Pomade, Jasminum grandiflorum.
Pomade, Acacia odorata.
Botanic Garden—
Senna tinnevelly, Cassia elongata.
Liquorice, European, Glycyrrhiza glabra.
C. Chubb, Esq., Ipswich—
Cayenne pepper, 2 bottles.
Botanic Garden—
Allspice, Pimenta vulgaris.
Botanic Garden—Fruits—
Queensland nuts, Macadamia ternifolia.
Bunya Bunya, Araucaria Bidwellii.
John Hall, Esq., Port Denison—
Cocoa nut, Cocos nucifera.
The second that has ripened in Queensland upon a cultivated tree.

TIMBERS.

CONIFERÆ.

1. Araucaria Bidwellii, Hook. *Bunya Bunya.* Diameter, 30 to 48 inches; height, 100 to 220 feet.
2. Araucaria Cunninghamii, Ait. *Moreton Bay pine.* 36 to 66; 150 to 200.
3. Dammara robusta, Moore. *Kaurie or Cundathu pine.* 36 to 72; 80 to 130.
4. Callitris columnaris, F. M. *Cypress pine.* 20 to 30; 40 to 60.
5. Callitris verrucosa, R. B. *The Desert cypress pine.* 12 to 24; 50 to 70.
6. Callitris Endlicheri, Parl. *The Mountain cypress pine.* 9 to 18; 40 to 50.
7. Podocarpus elatus, R. B. *She pine.* 20 to 36; 50 to 80.

AMENTACEÆ.

8. Casuarina tenuissima, Sieb. *River oak.* 18 to 22; 40 to 70.
9. Casuarina leptoclada, Miq. *The erect sheoak.* 9 to 15; 20 to 30.
10. Casuarina equisetifolia, Frost. *Swamp oak.* 12 to 20; 50 to 70.
11. Casuarina torulosa, Ait. *Forest oak,* Beefwood. 9 to 15; 30 to 35.
212. Casuarina Cunninghamii, Miq. *Fire oak.* 6 to 10; 20 to 30.

MELIACEÆ.

12. Cedrela toona, Rox. *Red cedar.* 24 to 76; 100 to 150.
13. Flindersia australis, R. B. *Flindosa.* 36 to 48; 80 to 100.
14. Flindersia Oxleyana. F. M. *Light yellow wood.* 24 to 42; 80 to 100.
15 Flindersia Bennetiana, F. M. *Bogum bogum.* 18 to 26; 70 to 90.
16. Flindersia maculosa, F. M. *Spotted tree of the colonists.* 12 to 18; 30 to 40.
17. Owenia venosa, F. M. *Sour plum.* 12 to 24; 40 to 65.
18. Owenia cerasifera, F. M. *Sweet plum.* 9 to 18; 25 to 35.
19. Amoora nitidula, Benth. 18 to 30; 70 to 90.

QUEENSLAND.

20. Synoum glandulosum, A. Juss. 15 to 24 ; 35 to 60.
21. Dysoxylon Muelleri, Benth. *Pencil cedar.* 20 to 35 ; 70 to 90.
215. Dysoxylon rufum, Benth. *Bastard cedar pencil wood.* 20 to 24 ; 40 to 60.
23. Melia composita, Willd. 15 to 20 ; 50 to 60.

SIMARUBEÆ.

24. Ailanthus imberbiflora, F. M. 20 to 28 ; 50 to 70.

RUTACEÆ.

25. Bosistoa sapindiformis, F. M. 6 to 12 ; 15 to 20.
26. Citrus australis, Planch. *Native orange.* 6 to 14.
27. Citrus australasica, F. M. *Native lime.* 6 to 10 ; 15 to 20.
28. Atalantia glauca, Hook. *The native cumquat.* 2 to 6 ; 8 to 15.
29. Acronychia Baueri, Schott. 6 to 12 ; 16 to 24.
30. Acronychia imperforata, F. M. 12 to 20 ; 20 to 40.
31. Acronychia lævis, Frost. 15 to 20 ; 30 to 50.
221. Pentaceras australis, Hook. *White cedar of the colonists.* 12 to 20 ; 40 to 60.
32. Zanthoxylon brachyacanthum, F. M. *Satin wood.* 6 to 9 ; 20 to 30.
33. Geijera parviflora, Lindl. 6 to 12 ; 20 to 30.
34. Geijera Muelleri, Benth. *Balsam capivi tree.* 12 to 18 ; 40 to 60.
35. Evodia micrococca, F. M. 6 to 10 ; 20 to 30.

CELASTRINEÆ.

36. Celastrus dispermus, F. M. 3 to 5 ; 12 to 16.
182. Siphonodon australe, Benth. 12 to 24 ; 40 to 60.
38. Denhamia pittosporoides, F.M. 6 to 8 ; 20 to 30.
39. Denhamia obscura, Meisn. 3 to 5 ; 12 to 20.
40. Elæodendron australe, Vent. 4 to 12 ; 20 to 30.

RHAMNEÆ.

41. Alphitonia excelsa, Reissek. *Mountain or red ash.* 18 to 24 ; 45 to 60.

PITTOSPOREÆ.

42. Pittosporum rhombifolium, A. Cunn. 6 to 12 ; 40 to 55.
43. Pittosporum bicolor, Hook. 6 to 12 ; 20 to 40.
44. Pittosporum phillyræoides, D. C. 4 to 6 ; 20 to 35.

CAPPARIDEÆ.

45. Capparis nobilis, F. M. *Small native pomegranate.* 6 to 14 ; 20 to 35.
46. Capparis Mitchelli, Lindl. *Wild native pomegranate.* 10 to 12 ; 14 to 30.
47. Apophyllum anomalum, F. M. 6 to 10 ; 20 to 30.

STERCULIACEÆ.

48. Sterculia quadrifida, R. B. 18 to 24 ; 40 to 60.
49. Sterculia diversifolia, G. Don. 18 to 24 ; 50 to 60.
50. Sterculia lurida, F. M. 12 to 15 ; 40 to 50.
51. Tarrietia argyrodendron, Benth. *Silver tree.* 24 to 34 ; 70 to 90.
52. Tarrietia actinodendron, F. M. 18 to 30 ; 60 to 70.
53. Commersonia echinata. Forst. 6 to 12 ; 20 to 30.

LINEÆ.

54. Erythroxylon australe, F. M. 6 to 12 ; 20 to 30.

SAPINDACEÆ.

55. Cupania xylocarpa. A. Cunn. 12 to 24 ; 40 to 60.
56. Cupania serrata, F. M. 8 to 14 ; 20 to 30.
57. Diploglottis Cunninghamii, Hook. *Native tamarind.* 12 to 20; 40 to 55.
58. Cupania semiglauca, F. M. 10 to 20 ; 30 to 60.
59. Cupania anacardioides, F. M. 12 to 18 ; 30 to 40.
60. Cupania pseudorhus, A. R. 14 to 20 ; 30 to 50.
61. Ratonia pyriformis, Benth. 10 to 18 ; 30 to 45.
62. Nephelium tomentosum, F. M. 10 to 15 ; 30 to 40.
63. Heterodendron oleæfolium, Desf. 4 to 10 ; 20 to 30.
64. Heterodendron diversifolium, F. M. 4 to 6 ; 10 to 15.
67. Harpullia pendula, Planch. *Tulip wood.* 14 to 24 ; 50 to 60.
68. Dodonæa triquetra, Andr. *Hop bush.* 3 to 4 ; 10 to 12.

ANACARDIACEÆ.

69. Rhus rhodanthemum, F. M. *Dark yellow-wood.* 18 to 24 ; 50 to 70
70. Spondias Solandri, Benth. 24 to 36 ; 40 to 60.

ARALIACEÆ.

71. Panax elegans, F. M. 12 to 16 ; 30 to 40.

RUBIACEÆ.

72. Sarcocephalus cordatus, Miq. *Leichhardt's tree.* 24 to 30 ; 40 to 60.
73. Ixora Pavetta, Rox. 2 to 4 ; 8 to 10.
74. Hodgkinsonia ovatiflora, F. M. 6 to 10 ; 12 to 20.
75. Canthium lucidum, Hook and Arn. 6 to 12 ; 20 to 30.
76. Canthium oleifolium, Hook. 4 to 10 ; 25 to 30.
77. Canthium latifolium, R. B. 8 to 12 ; 25 to 30.
78. Canthium vacciniifolium, F. M. 2 to 4 ; 6 to 10.
79. Canthium coprosmoides, F. M. 4 to 6 ; 20 to 30.
80. Canthium attenuatum, R. B. 3 to 6 ; 15 to 20.
81. Same as No. 78.
82. Cœlospermum paniculatum, F. M. 3 to 5 ; 100 to 150.

MYRTACEÆ.

83. Leptospermum flavescens, Sm. 3 to 6 ; 10 to 15.
86. Callistemon lanceolatus, D. C. *Bottle-brush tree.* 12 to 18 ; 30 to 40.
87. Callistemon salignus, D.C. *Broad-leaved tea tree.* 18 to 24 ; 40 to 60.
88. Melaleuca genistifolia, Sm. 6 to 12 ; 30 to 40.
89. Melaleuca leucadendron, Lin. *White tea tree.* 24 to 40 ; 40 to 60.
90. Melaleuca styphelioides, Sm. *Prickly-leaved tea tree.* 24 to 30 ; 40 to 60.
84. Melaleuca linariifolia, Sm. 20 to 24 ; 30 to 40.
85. Melaleuca nodosa, Sm. *Tea tree.* 10 to 20 ; 30 to 40.
92. Angophora subvelutina, F. M. *Apple tree.* 20 to 26 ; 40 to 60.
93. Eucalyptus pilularis, Sm. *Black butt.* 24 to 40 ; 60 to 80.
94. Eucalyptus hæmastoma, S. M. *Spotted gum.* 24 to 48 ; 60 to 90.
95. Eucalyptus microcorys, F. M. 18 to 30 ; 60 to 80.
96. Eucalyptus hemiphloia, F. M. *Yellow box.* 20 to 30 ; 40 to 60.
97. Eucalyptus siderophloia, Benth. *Ironbark.* 20 to 30 ; 60 to 80.
98. Eucalyptus melanophloia, F. M. *Silver-leaved ironbark.* 18 to 20 ; 30 to 60.
99. Eucalyptus maculata, Hook. *Spotted gum.* 20 to 30 ; 60 to 80.
100. Eucalyptus saligna, Sm. *Grey gum.* 24 to 34 ; 60 to 80.
101. Eucalyptus resinifera, Sm. *Red mahogany.* 20 to 30 ; 60 to 70.
102. Eucalyptus corymbosa, Sm. *Bloodwood.* 24 to 30 ; 50 to 60.
103. Eucalyptus botryoides, Sm. *Blue gum.* 30 to 48 ; 70 to 90.
104. Eucalyptus tereticornis, Sm. *Red gum.* 18 to 30 ; 60 to 80.
105. Eucalyptus Stuartiana, F. M. *Turpentine tree.* 24 to 36 ; 60 to 80.
106. Eucalyptus fibrosa, F. M. *Stringy bark.* 18 to 24 ; 40 to 60.

QUEENSLAND.

108. Eucalyptus tesselaris, F. M. *Moreton Bay ash.* 14 to 24; 30 to 60.
109. Backhousia myrtifolia, Hook and Harv. *Myrtle.* 12 to 18; 20 to 40.
167. Backhousia citriodora, F. M. 6 to 12; 30 to 30.
165. Myrtus acmenioides, F. M. 12 to 18; 30 to 40.
168. Eugenia Smithii, Poir. *Lilly pillies.* 12 to 18; 30 to 40.
169. Eugenia Ventenatii, Benth. 18 to 20; 40 to 60.
111. Myrtus Hillii, Benth. *Scrub ironwood.* 6 to 12; 20 to 40.
110. Rhodamnia trinervia, Blum. 10 to 18; 20 to 30.
112. Rhodomyrtus psidioides, Benth. 12 to 20; 30 to 40.
113. Rhodamnia argentea, Benth. 15 to 22; 40 to 60.
114. Tristania conferta, R. B. *Box.* 36 to 50; 80 to 100.
116. Barringtonia careya, F. M. *Broad-leaved apple tree.* 14 to 20; 40 to 50.

PROTEACEÆ.

110*. Grevillea robusta. *Silky oak.* 30 to 40; 80 to 100.
111*. Stenocarpus sinuatus, Endl. *Tulip tree.* 18 to 30; 40 to 80.
112*. Macadamia ternifolia, F. M. *Queensland nut.* 3 to 12; 30 to 50.
113*. Orites excelsa, R. B. 6 to 14; 30 to 60.
114*. Banksia integrifolia, Linn. *Beef wood.* 8 to 12; 20 to 30.
115*. Persoonia lucida, Var. latifolia, A. Cunn. 3 to 7; 10 to 20.
116*. Grevillea Hilliana, F. M. 10 to 18; 40 to 60.
216. Grevillea gibbosa, R. B. 8 to 12; 20 to 30.

RHIZOPHOREÆ.

116*2. Bruguiera Rheedii, Blume. *Mangrove.* 6 to 12; 12 to 20.

THYMELACEÆ.

117. Exocarpus latifolius, R. B. *Broad-leaved cherry-tree.* 6 to 9; 12 to 25.
118. Exocarpus cupressiformis, R. B. *Cherry-tree.* 4 to 8; 10 to 16.

SANTALACEÆ.

119. Santalum lanceolatum, R. B. *Sandal wood.* 3 to 6; 15 to 25.

MYOPORINEÆ.

120. Eremophila Mitchelli, Benth. *Bastard sandal wood.* 6 to 12; 20 to 30.
124. Myoporum acuminatum, Var. parviflorum, R. B. 4 to 6; 12 to 15.
125. Myoporum acuminatum, R. B. 6 to 14; 15 to 25.
126. Myoporum platycarpum, R. B. 12 to 15; 15 to 25.

VERBENACEÆ.

121. Avicennia officinalis, Linn. *Mangrove.* 19 to 20; 20 to 30.
122. Gmelina Leichhardtii, F. M. *Beech.* 24 to 36; 80 to 100.
123. Vitex lignum-vitæ, A. Cunn. *Scrub lignum vitæ.* 20 to 24; 50 to 70.
127. Clerodendron tomentosum, R. B. 6 to 9; 20 to 25.

TILIACEÆ.

128. Elæocarpus obovatus, G. Don. 12 to 20; 30 to 40.
129. Elæocarpus grandis, F. M. *Callhum.* 24 to 36; 80 to 90.

LEGUMINOSÆ.

134. Acacia falcata, Willd. 6 to 12; 20 to 30.
135. Acacia glaucescens, Willd. 12 to 18; 30 to 45.
136. Acacia Cunninghamii, Hook. 9 to 12; 20 to 30.
137. Same as 135 in a younger stage.
138. Acacia fasciculifera, F. M. 10 to 16; 30 to 40.
139. Acacia salicina, Lindl. 6 to 12; 30 to 40.

140. Acacia implexa, Benth. *12 to 16; 30 to 40.*
141. Acacia harpophylla, F. M. 12 to 20; 40 to 70.
142. Same as 141 in a younger stage.
143. Acacia excelsa, Benth. *Brigalow.* 20 to 30; 50 to 80.
144. Acacia neriifolia, A. Cunn. 6 to 12; 20 to 30.
145. Acacia doratoxylon, A. Cunn. 6 to 12; 25 to 35.
146. Acacia pendula, A. Cunn. *Weeping Myall.* 6 to 12; 20 to 35.
147. Acacia stenophylla, A. Cunn. *Ironwood.* 15 to 24; 40 to 60.
148. Same as 145. From R. F. Walker, Gowrie Creek.
149. Acacia leptostachya, Benth. 4 to 10; 20 to 25.
150. Acacia uncifera, Benth. 3 to 5; 6 to 10.
151. Acacia decurrens, Willd. *Green wattle.* 3 to 8; 30 to 40.
152. Acacia amblygona, A. Cunn. 6 to 10; 20 to 25.
153. Acacia striata, Hill. 6 to 18; 40 to 50.
154. Acacia decurrens, Var. mollis, Lindl. *Silver wattle.* 6 to 10; 30 to 40.
155. Albizzia Thozetiana, F. M. 12 to 30; 40 to 60.
162. Acacia linifolia, Willd. 3 to 4; 10 to 15.
163. Acacia penninervis, Sieb. 2 to 4; 6 to 12.
219. Pithecolobium pruinosum, Benth. 5 to 12; 40 to 50.
222. Hovea acutifolia, A. Cunn. 2 to 4; 6 to 10.
156. Castanospermum australe, A. Cunn. *Moreton Bay chesnut.* 24 to 36; 80 to 90.
157. Barklya syringifolia, F. M. 12 to 18; 40 to 60.
158. Cassia Brewsteri, F. M. 3 to 6; 30 to 50.
159. Jacksonia scoparia, R. B. *Dogwood.* 3 to 8; 10 to 15.
160. Galactia tenuiflora, Willd. 3 to 9; 200 to 300.
170. Peltophorum ferrugineum, Benth. 24 to 30; 40 to 80.
164. Erythrina vespertilio, Benth. *Coral tree.* 12 to 15; 30 to 40.

CORNACEÆ.

170*. Marlea vitiensis, Benth. *Musk tree.* 6 to 12; 20 to 30.

JASMINEÆ.

171. Olea paniculata, R. B. *Native olive.* 18 to 24; 50 to 70.
172. Notelæa ovata, R. B. *Dunga vunga. 6 to 12; 20 to 30.*
173. Notelæa longifolia, Vent. 12 to 18; *30 to 40.*
174. Notelæa microcarpa, R. B. 9 to 12; 30 to 45.

LAURINEÆ.

175. Endiandra pubens, Meissn. 18 to 24; 40 to 70.
176. Tetrantlrera ferruginea, R. B. 14 to 20; 30 to 40.
178. Tetranthera reticulata, Meissn. 15 to 24; 30 to 60.
177. Litsæa dealbata, Nees. 18 to 24; 40 to 60.
179. Nesodaphne obtusifolia, Benth. 18 to 30; 40 to 70.
180. Cryptocarya patentinervis, F. M. 12 to 20; 30 to 40.

ERENACEÆ.

181. Cargillia australis, R. B. 6 to 12; 30 to 40.
183. Maba fasciculata, F. M. 18 to 24; 60 to 80.

EUPHORBIACEÆ.

184. Baloghia lucida, Endl. *Bloodwood. 8 to 16; 30 to 40.*
185. Mallotus philippinensis, J. Muell. *6 to 14; 30 to 45.*
186. Mallotus claoxyloides, J. Muell. *9 to 16; 15 to 30.*
187. Mallotus nesophilus, J. Muell. *12 to 18; 35 to 45.*
188. Croton insularis, Baill. *Cascarilla. 8 to 12; 30 to 40.*
189. Cœlebogyne ilicifolia, J. Sm. *2 to 4; 6 to 14.*
190. Croton Verreauxii, Baill. 3 to 5; 15 to 20.
191. Petalostigma quadriloculare, F. M. *Crab tree.* 12 to 18; 40 to 50.

QUEENSLAND.

192. Excœcaria Agallocha, Linn. *River poisonous tree.* 6 to 18; 20 to 30.
193. Briedelia exaltata, F. M. 12 to 18; 30 to 45.
194. Bradleia australis, R. B. 12 to 18; 13 to 50.

MONIMIACEÆ.

195. Daphnandra micrantha, Benth. 18 to 30; 60 to 80.

SAPOTACEÆ.

196. Hormogyne cotinifolia, A. D. C. 6 to 9; 20 to 35.
217. Chrysophyllum pruniferum, F. M. 12 to 20; 30 to 70.

APOCYNEÆ.

127*. Alstonia constricta, F. M. *Fever bark.* 6 to 20; 40 to 50.

URTICEÆ.

197. Celtis ingens, F. M. 6 to 12; 25 to 35.
198. Celtis Philipensis, Blanco. 4 to 12; 20 to 40.
199. Laportea photiniphylla, Cunn. *Nettle tree.* 15 to 24; 30 to 50.
202. Ficus aspera, Forst. *Rough fig.* 9 to 18; 30 to 45.
206. Morus calcar galli, Cunn. *Cockspur thorn.*

SAXIFRAGEÆ.

205. Ceratopetalum apetalum, Don. *Coachwood.* 24 to 36; 70 to 90.

EBENACEÆ.

200. 5 to 12; 20 to 30.

RUTACEÆ.

201. 6 to 12; 16 to 24.
203. 8 to 14; 30 to 50.

CELASTRINEÆ.

207. 4 to 6; 20 to 30.

RUBIACEÆ.

208. 12 to 16; 30 to 40.

PITTOSPOREÆ.

209. 2 to 4; 8 to 12.

SAPOTACEÆ.

210 12 to 18; 40 to 60.

LEGUMINOSÆ.

240. 6 to 9; 20 to 30.

J. C. Thompson, Esq., Ruyanua—
Mr. Walker, Townsvale, Logan River—
1 block of cypress pine.
1 board of red cedar.
Mr. Sims, Union Saw Mills, Maryborough—
1 block of Kawrie pine.
Mr. R. F. Walker, Gowrie Creek.
1 block of sandal wood.
The following articles exhibited, which have been made from Queensland wood:
Mr. D. Hume, cooper, Brisbane—
2 model rum hogsheads.
2 model tallow casks.
2 model sugar vats.
Manufactured from colonial woods.

Mr. William Pettigrew, Brisbane—
8 axe and pick handles.
Manufactured from colonial timbers.

Mr. W. S. Mackie, turner, Brisbane—
Egg Stand—Foot of ditto, beech.
Pillar of ditto, cyress pine.
Spoon rack of ditto, ironwood.
Salt cup of ditto, deep-yellow wood.
Egg Cups—1. Tulip wood.
2. Forest oak.
3. Silky oak.
4. Swamp oak.
5. Sandal wood.
6. Purple wood.
7. Cedar.
8. Boxwood.
9. Deep-yellow wood.
10. Black wattle.
11. Moreton Bay chesnut.
12. Light-yellow wood.

GUMS.

Botanic Garden—
Gum :—Xanthorrhœa arborea.
Eucalyptus corymbosa.
Eucalyptus siderophloia.
Eucalyptus maculata.
Tanning Barks:—
1. Green wattle—Acacia decurrens.
2. Silver wattle—Acacia decurrens, var. Mollis.
3. Acacia penninervis.

Coal, from the Tivoli Coal Mine, near Ipswich, in two large blocks (boxes Nos. 45 and 46), exhibited by Messrs. Gulland & Co.

Coke, from the Tivoli Mine, exhibited by Messrs. Gulland & Co. (boxes Nos. 48 and 49).

Allora coal, Darling Downs, in two large blocks (boxes Nos. 47 and 50).

Coal, from the Bingera Coal Mine, Bundaberg, Lower Burnett, exhibited by Mr. A. Walker, in one block (box No. 55).

Coal, from Rosewood, West Moreton, in pieces (box No. 43).

Coal, from the Aberdare Coal Mine, in small blocks (boxes Nos. 60 and 61).

Coal, from Flagstone Creek Coal Mine, Toowoomba, in two large blocks (box No. 58, and exhibited by Mr. J. S. McIntyre).

Cannel coal, from Blackfellow's Creek, near Gatton, in two specimens (box No. 56), exhibited by Mr. G. Harden, Brisbane.

Fireclay from the Bingera Coal Mine, exhibited by Mr. A. Walker (box No. 54).

Impalpable sand, consisting of exceedingly finely-crushed quartz, mixed with infusoria from the neighbourhood of Brisbane, exhibited by Mr. Petrie.

Pebbles in a bottle (box 56), exhibited by Mr. Franklin.

Pebbles in a small bottle (box 56), exhibited by Mr. Grossman, Spring Creek, Stanthorpe.

Ornamental stone from Rawbelle (box 56), excelling in its pleasing mixture of carbonate of copper, flesh-red feldspar, and white quartz.

White marble, unpolished piece from Ravenswood, sent by Mr. Hackett.

White marble
Grey „
Red „
Variegated „
} From each sort one piece highly polished, exhibited by Mr. Petrie.

Iron ore, in one large block (box No. 63), exhibited by J. S. McIntyre, Esq., Toowoomba.

QUEENSLAND.

Iron ore, one piece (box No. 56), exhibited by Mr. A. Foote, Ipswich.
Iron ore, two large pieces (boxes 44 and 63), exhibited by Mr. Russell, Pine Mountain, West Moreton.
Micaceous iron ore, in two pieces (box No. 56).
Chrom-iron ore, several large blocks (box No. 53), exhibited by Mr. John Harris, Ipswich.
Ore of Manganese, in pieces (box No. 52).
Tin Ore—
1 sample of large crystals in one bag.
2 samples of surface dirt in two bags.
1 sample of screened surface dirt in one bag.
3 samples of lode tin in granite and quartz, exhibited by Mr. G. H. Davenport (box No. 51).
Stream tin and country (box No. 56), from Spring Creek, near Stanthorpe.
Bismuth, found in its metallic state on Chinaman's Flat, Cloncurry (box No. 56).
Carbonate and oxide of bismuth, found in nearly all gold workings on the Cloncurry; chiefly in Chinaman's, Cameron's, and Sharkey's leads, Old Diggings (box No. 56).
Sulphuret of antimony, exhibited by Mr. J. Honeyman.
Cinnabar, exhibited by Messrs. MacTaggart and Party.
Galena, one specimen, exhibited by Mr. Godfrey (box No. 56).
Galena, one specimen from Buchanan Creek, Western Creek, found during the erection of telegraph to Normanton.
Galena with silver, surface specimen from Staunton Harcourt, Burnett district, exhibited by Mr. W. H. Franklin.
Virgin copper, with crystals of metallic copper, several large pieces from Messrs. Sheaffe and Henry's claim on the Cloncurry.
Ruby copper, from Messrs. Sheaffe and Henry's claim on the Cloncurry.
Copper ore, four miles from the junction of the Duck Creek with the Cloncurry, consisting of malachite in needle-formed crystals, and common green carbonate of copper.
Copper ore, exhibited by Mr. W. H. Franklin.
Copper ore from the Rawbelle Mine, Rawbelle, Burnett district. The ore comes from a depth of 20 feet.
Copper ore from Mount Alma, Gladstone.
Copper ore from Cressbrook Creek, West Moreton.
Copper ore, in one large block, weighing 1½ tons, exhibited by the directors of the Normanby Copper Mine, Mount Perry.

ANGORA MOHAIR.

One fleece, unwashed, from a pure Angora buck, bred by Charles Clark, Esq., East Talgai, Darling Downs (box 35).
One fleece, unwashed (box 35), from a third cross with common goat, bred by ditto.
One-half fleece from a pure Angora yearling buck, bred by the Honourable Captain Simpson, M.L.C., East Moreton.
One-half fleece from yearling female of third cross with common goat, bred by ditto.

WOOL.

Two fleeces, bred by Leonard E. Lester, Esq., manager North British Australian Company, Rosenthal, near Warwick (box 36), clothing wool, washed by hot soak and cold spout.
Four fleeces pure Australian Merino, fine combing, bred by George Clark, Esq., East Talgai, Darling Downs (box 37), one in the grease, and three showing the effect of different process of cleansing by steaming, hot and cold soak and spout.
Two fleeces in the grease, Australian Merino clothing, bred by Messrs. Hogarth and Beattie, Balgownie, Darling Downs.

QUEENSLAND

PRESERVED FRUITS.

(Box 39), samples of marmalade from Queensland oranges, preserved in Queensland sugar, Nehemiah Bartley.

Samples of candied fruit-rock, melon, ginger, pine-apple, and candied peels, preserved and exhibited by W. H. Hayes, Brisbane.

OILS AND ANIMAL PRODUCTS.

One bottle unrefined cotton-seed oil, and

One bottle refined ditto, made and exhibited by W. R. Alexander, Redbank, Brisbane River.

One bottle clarified sheep-trotter oil, Maning and Staiger, Redbank, Brisbane.

One bottle albumen, the produce of one sheep, ditto, ditto.

PRESERVED MEAT.

Samples of preserved meats. The Central Australian Meat Preserving Company, Rockhampton.

Samples extract of meat (box 42) prepared and exhibited by Robertson Brothers, Baffle Creek.

COTTON SEED MEAL.

1 bag, W. R. Alexander, Esq., Redbank.

LEATHERS.

Exhibited by T. B. Stephens, Esq., of Ekibin Tannery, three miles from Brisbane—

1 side brown harness leather, 16lbs., value 1*s.* 6*d.* per lb.
1 side black „ „ 27 „ „ 1*s.* 8*d.* „
1 side sole „ „ 19 „ „ 1*s.* 1*d.* „
1 side kip, 8lbs., value 2*s.* per lb.
1 side black-grained kip, 7lbs., value 2*s.* 6*d.* per lb.
1 calfskin, waxed, 14½ oz., value 4*s.* 6*d.* per lb.
1 black-grained kangaroo, 1 flat ditto ditto } 3¼ lbs., value 4*s.* 6*d.* per lb.
3 waxed wallaby skins, ½ lb. each, value 4*s.* 6*d.* per lb.
2 wallaby skins, dressed with fur on, value say 2*s.* 6*d.* each.

The above are Brisbane manufacturers' prices.

SOUTH AUSTRALIA.

SOUTH AUSTRALIA.

C. B. Fisher, Buckland Park—
Large glass frame, containing samples of Merino wool.
Photographs of sheep and horses bred in the colony.
Bag of fine wheat, 69 lbs. per bushel, grown on his "Hill River" estate.

Lorimer & Co., Adelaide—
Samples of red and white wines.

Wm. Nitschke, Adelaide—
Samples of brandy, rum, cherry brandy, and other liqueurs.

F. C. Davis, Adelaide—
Preserved fruits, orange bitters, and other liqueurs.

Australian Vineyards Association, P. B. Burgoyne, manager, 50, Old Broad Street, E.C.
Red Wines:—"Tintara," "Beaumont," "Mataro," "Highercombe," "Pommard," "Glenelg."
White Wines:—"Highercombe," "Temperana," "Pedro Ximenes," "Doradillo."
Liqueurs:—"Muscatel," "Shiraz," "Donzalino."

SOUTH AUSTRALIA.

William Green, Gawler Park—
Wines, red and white Riesling.
Tintara Vineyards Association, Adelaide—
Collection of red and white wines.
Patrick Auld, Auldana Vineyard—
Collection of red and white wines.
Joseph Gilbert, Pewsey Vale—
Collection of red and white wines.
Adelaide Meat Preserving Company—
Collection of tins of various kinds of preserved meats.
E. M. Bagot, Adelaide—
Tins of extract of meat.
J. H. Angas, Angas Park—
Dressed sheep skin, cross bred Lincoln and Merino wether.
Wm. Brooks, Woodchester—
Wheat.
Wm. Bowman, Middleton Mills—
Fine flour.
Magarey & Co., Hindmarsh Steam Mills—
Fine flour.
Wm. Harrison & Co., Gawler Steam Mills
Fine flour.
Botanical Garden, Adelaide—
Album, containing numerous views of the gardens.

TRINIDAD.

TRINIDAD.

Collection of woods sent by Mr. S. Devenish—
1 cask asphalte epurier.
1 lump crude asphalte, exhibited by the Government of Trinidad.
1 bottle gum Balata (Mimusops globosa) in a milky state, as drawn from the tree.
Samples of this gum coagulated with spirit of wine, exhibited by the Chagnanas Convict Depôt, Trinidad.
1 bottle cocoa, grown on the "San Antoine" estate (proprietor, Sir Joseph Needham).

List of Specimens of Trinidad Woods sent to the Vienna Exhibition.

No. of Order.	Common Names.	Scientific Names.	Families.
1	Acacia	Acacia Farnesiana	Mimosæ.
2	Acoma or mastic	- - -	Sapotaceæ.
3	Allspice or pimento	Pimenta vulgaris	Myrtaceæ.
4	Angelin	Andira inermis	Leguminosæ.
5	Balata or bullet-tree	Mimusops globosa	Sapotaceæ.
6	Balsam capivi	Copaifera officinalis	Leguminosæ.
7	- - -	Citharexylon quadrangulare	Verbenaceæ.
8	- - -	Swartzia pinnata	Leguminosæ.
9	- - -	Licania incana	Chrysobalanæ.
10	Bloodwood	Vismia cayennensis	Hypericaceæ.
11	Bread fruit	Artocarpus incisa	Artocarpæ.
12	Carapo	Carapa guianensis	Meliaceæ.
13	Calabash	Crescentia Cujete	Crescentiaceæ.
13a	Wild calabash	Crescentia latifolia	Id.

TRINIDAD.

No. of Order.	Common Names.	Scientific Names.	Families.
14	Caracas tree	Calliandra Zaman	Leguminosæ.
15	Cedar	Cedrela odorata	Cedrelaceæ.
16	Cocoanut	Cocos nucifera	Palmæ.
17	Cyp	Cordia gerascanthus	Cordiaceæ.
18	Fustic	Maclura Xanthoxylon	Urticaceæ.
19	Galba	Calophyllum Calaba	Clusiaceæ.
20	Gasparillo	Esenbeckia	Diosmeæ.
21	Genipa	Genipa	Rubiaceæ.
22	Gommier	Bursera gummifera	Terebinthaceæ.
23	Governor's plum	Flacourtia Ramontchi	Flacourtiaceæ.
24	- - - -	Warscewiczia coccinea Calycophyllum coccineum	Rubiaceæ.
25	Guatecare	Lecythis Idatimon	Lecythidæ.
26	Guava	Psidium pyriferum	Myrtaceæ.
27	Hickory (Trinidad)	Brownea coccinea	Leguminosæ.
28	Hogplum	Spondias Monbin	Terebinthaceæ.
29	Laurel	Laurus	Laurineæ.
30	Laurel cyp	- - - -	Id.
31	Letter or leopard wood	Brosimum guianense	Artocarpeæ.
32	Lignum vitæ	Guaicum officinale	Xanthoxyleæ.
33	Lime tree	Citrus Limonum	Aurantiaceæ.
34	Locust	Hymenea Courbaril	Leguminosæ
35	Logwood	Hematoxylon campechianum.	Id.
36	- - - -	Poinsettia pulcherrima	Id.
37	Mammee apple	Mammea americana	Clusiaceæ.
38	Manchineel	Hippomane Mancinella	Euphorbiaceæ.
39	Mangrove	Conocarpus	Combretaceæ.
40	Monkey Balata	- - -	Sapotaceæ.
41	Monkey bones	- - -	Myrtaceæ.
42	Mora	Mora excelsa	Leguminosæ.
43	Moussara	Brosimum Alicastrum	Urticaceæ.
44	Murraya	Murraya exotica	Aurantiaceæ.
45	- - -	Zanthoxylum	Terebinthaceæ.
46	Olivier	Bucida Buceras	Combretaceæ.
47	- - -	Bauhinia grandiflora	Leguminosæ.
48	Poui	Tecoma	Bignoniaceæ.
49	Purple heart	Peltogyne paniculata	Leguminosæ.
50	Red Mangrove	Rhizophora Mangle	Rhizophoraceæ
51	Red wood	Trichilia Moschata	Meliaceæ.
52	Roble	Platymiscium polystachium	Leguminosæ.
53	Sapodilla	Achras Sapota	Sapotaceæ.
54	Savana Yoke	Piptadenia	Mimosæ.
55	Savonette (yellow)	Lonchocarpus latifolia	Leguminosæ.
56	Sea-side grape	Coccoloba uvifera	Polygonaceæ.
57	- - -	Byrsonima spicata	Malpighiaceæ.
58	Tamarind	Tamarindus indica	Leguminosæ.
59	Tapana	Stilaginella	Euphorbiaceæ.
60	- - -	Mimosa lithoxylum	Mimosæ.
61	- - -	Thespesia populnea	Malvaceæ.
62	Wild tamarind	Pentaclethra filamentosa	Leguminosæ.
63	White Mangrove	Avicennia tomentosa	Verbenaceæ.
64	Yoke	Acacia	Leguminosæ.
65	Cashew tree	Anacardium occidentale	Anacardiaceæ.
66	Yellow Sanders	Zanthoxylum Clava Herculis.	Xanthoxylaceæ.
67	Surinam or Cayenne cherry.	Eugenia Mitchelli	Myrtaceæ.

TRINIDAD.

No. of Order.	Common Names.	Scientific Names.	Families.
68	Mango tree	Mangifera indica	Terebinthaceæ.
69	- - -	Jacaranda cœrulea	Bignoniaceæ.
70	- - -	Myrospermum frutescens	Leguminosæ.
71	Guenepe	Melicocca bijuga	Sapindaceæ.
72	Avocado pear	Persea gratissima	Laurinæ.
73	Wild Angelin	Diplotropis brachypetala	Leguminosæ.
74	Scotch friend	Ficus	Artocarpeæ.
75	Akee	Akeesia (Blighia sapida)	Sapindaceæ.
76	Sapote	Lucuma mammosa	Sapotaceæ.
77	Bitter ash	Quassia amara	Simarubaceæ.
78	Rough leaf	Curatella americana	Dilleniaceæ.
79	Bloodwood	Croton gossypifolium	Euphorbiaceæ.
80	Sandbox	Hura crepitans	Id.
81	Contrevent	Achras	Sapotaceæ.
82	Frangipani	Plumeria	Apocyneæ.
83	Cassia (long)	Cassia brasiliensis	Leguminosæ.
84	- - -	Thevetia neriifolia Cerbera Thevetia	Apocyneæ.
85	Malacca apple	Eugenia malaccensis	Myrtaceæ.
86	Pandanus	Pandanus Candelabrum	Pandanaceæ.
87	Bermuda cedar	Juniperus bermudiana	Coniferæ.
88	Fiddle wood	Vitex capitata	Verbenaceæ.
89	Grugru	Acrocomia sclerocarpa	Palmæ.
90	Pois dous	Inga	Mimosæ.
91	Mabolo	Diospyros Mabolo	Ebenaceæ.
92	- -	Pisonia	Nyctagineæ.
93	White wood	Tecoma pentaphylla	Bignoniaceæ.
94	- - -	Hirtella silicea	Chrysobalaneæ.
95	Royoc	Morinda	Rubiaceæ.
96	Beef wood	Rhopala montana	Proteaceæ.
97	Grugru	Acrocomia sclerocarpa	Palmæ.
98	Incense tree	Icica heptaphylla Amyris Trinitensis	Amyridæ.
99	Star apple	Chrysophyllum Cainito	Sapotaceæ.
100	Noyau	Prunus occidentalis	Drupaceæ.
101	Sea side almond	Terminalia	Combretaceæ.
102	- - -	Id.	Id.
103	Black mangrove	Conocarpus erecta	Id.
104	- - -	- - -	Leguminosæ.
105	- - -	Chrysobalanus	Chrysobalaneæ.
106	- - -	Campomanesia aromatica	Myrtaceæ.
107	Stavewood	Coccoloba latifolia	Polygonaceæ.
108	Wild nutmeg	Rheedia laterifolia	Guttiferæ.
109	Garlic pear	Cratæva	Capparidaceæ.
110	Cocorita	Maximiliana insignis	Palmæ.
111	Rose apple	Jambosa vulgaris	Myrtaceæ.
112	- - -	Chrysophyllum glabrum	Sapotaceæ.
113	Mountain cabbage	Oreodoxa regia	Palmæ.
114	- -	Bauhinia variegata	Leguminosæ.
115	Savana cyp	Cordia	Cordiaceæ.
116	- - -	- - -	Sapotaceæ.
117	- - -	Cicca disticha	Euphorbiaceæ
118	Clove	Caryophyllus aromaticus	Myrtaceæ.
119	Nutmeg	Myristica aromatica	Myristicaceæ.
120	Queen of flowers	Lagerstræmia Regina	Leguminosæ.
121	Mahogany	Swietenia Mahogani	Id.
122	Acacia	Acacia tortuosa	Mimoseæ.
123	Corkwood	Ochroma Lagopus	Bombaceæ.

No. of Order.	Common Names.	Scientific Names.	Families.
124	Elm	Guazuma ulmifolia	Byttneriaceæ.
125	Yellow Mangrove	—	?
126	Voavanga	—	Rubiaceæ.
127	—	Peridium	Euphorbiaceæ.
128	—	Sponia	Urticaceæ.
129	—	Phoberos	Flacourtiaceæ.
130	Mahaut	Heliocarpus americana	Malvaceæ.
131	Fig tree	Ficus Radula	Urticaceæ.
132	—	Anona reticulata	Anonaceæ.
133	—	Rollinia multiflora	?
134	—	Pereskia	Cactaceæ.
135	Black sage	Cordia	Cordiaceæ.
136	—	Stereospermum chelonoides	Bignoniaceæ.
137	—	Psychotria	Rubiaceæ.
138	Cannon ball or Bombshell tree	Couroupita guianensis	Lecythidaceæ.
139	—	Panax	Araliaceæ.
140	Fig tree	Ficus	Urticaceæ.
141	Almond tree	Terminalia C. tappa	Combretaceæ.
142	—	Diospyros sp.	Ebenaceæ.
143	—	—	Cordiaceæ.
144	—	—	—
145	—	Maba inconstans	Ebenaceæ.
146	Sea side plum	Ximenia americana	—
147	Cocoa plum or fat pork.	Chrysobalanus Icaco	Chrysobalaneæ.
148	Sea side Mahaut	Paritium tiliaceum	Malvaceæ.
149	Orange tree	Citrus Aurantium	Aurantiaceæ.
150	—	Bunchosia	Malpighiaceæ.
151	Cocoa-tree	Theobroma Cacao	Byttneriaceæ.
152	Debasse	Calyptranthes sericea	Myrtaceæ.
153	—	Randia	Rubiaceæ.
154	—	Machærium	Leguminosæ.
155	Wild cocoa	Coccoloba	Polygonaceæ.
156	—	Calliandra sp.	Leguminosæ.
157	—	—	—
158	Piroa	Gulielma sp.	Palmæ.
159	—	Œnocarpus Batawa	Id.
160	Coffee tree	Coffea arabica	Rubiaceæ.
161	—	Swartzia grandiflora	Leguminosæ.
162	—	Podocarpus	Coniferæ.
163	Wild Chestnut	Pachira aquatica	Bombaceæ.
164	—	Sacoglottis amazoncia	Styraceæ.
165	White cedar	Myristica	Myristicaceæ.
166	—	Pisonia sp.	Nyctagineæ.
167	Bird Lime Tree	Sapium aucuparium	Euphorbiaceæ.
168	—	Pithecolobium sp.	Leguminosæ.
169	—	Pterocarpus Draco	Id.
170	—	?	Sapindaceæ.
171	—	?	Laurineæ.
172	White Savonette	Machærium	Leguminosæ.
173	—	Isertia parviflora	Rubiaceæ.
174	Thorns of l'epineux	ZanthoxylumClavaHerculis	Xanthoxylaceæ.
175	Gregri	Martinezia caryotæfolia	Palmæ.
176	Arnotto	Bixa orellana	Bixaceæ.
177	—	Apeiba aspera	Tiliaceæ.
178	Yellow sandbox	?	Euphorbiaceæ.
179	—	Avicennia tomentosa	Verbenaceæ.

TRINIDAD.

No. of Order.	Common Names.	Scientific Names.	Families.
180	- - - -	Malpighia - - -	Malpig Niaceæ.
181	- - - -	Clusia rosea - -	Clusiaceæ.
182	- - - -	Ilex macoucou - -	Ilicineæ.
183	- - - -	Casearia - - -	Samydeæ.
184	- - - -	—	—
185	Mawbee stick -	Colubrina reclinata -	Rhamneæ.
186	Sweet sop - -	Anona squamosa - -	Anonaceæ.
187	Wild coffee - -	- - - -	Rubiaceæ.
188	- - - -	Mollinedia - -	—
189	- - - -	Dracæna - - -	Liliaceæ.
190	- - - -	- - - -	Ebenaceæ.
191	- - - -	- - - -	Samydeæ.
192	- - - -	Capparis cynophallophora -	Capparidaceæ
193	- - - -	Oliganthes condensata -	Compositæ.
194	- - - -	Tecoma Stans - -	Bignoniaceæ.
195	Olive wood - -	Capparis jamaicensis -	Capparidaceæ.
196	- - - -	Croton sp. - -	Euphorbiacea.
197	- - - -	- - - -	Myrtaceæ.
198	- - - -	- - - -	Samydaceæ.
199	—	—	—
200	Cactus - -	Cactus heptagonus -	Cactaceæ.
201	Dividivi - -	Cæsalpinia Coriaria -	Leguminosæ.
202	- - - -	Copaifera hymenæifolia -	Id.
203	- - - -	- - - -	Myrsineæ.
204	- - - -	?	?
205	- - - -	Miconia prasina - -	Melastomaceæ.
206	- - - -	Sponia - - -	Urticaceæ.
207	- - - -	? - -	?
208	- - - -	? - -	?
209	- - - -	Cordia sp. (red flowers) -	Cordiaceæ.
210	- - - -	Ruprechtia sp. - -	Polygonaceæ.
211	- - - -	? - -	?
212	Cherry wood (from Chacachareo Island).	Pholacilia trifoliata -	Meliaceæ.
213	- - - -	Aspidosperma - -	Apocyneæ.
214	- - - -	Solanum callicarpifolium -	Solanaceæ.
215	- - - -	- - - -	?
216	- - - -	Coccoloba sp. - -	Polygonaceæ.
217	- - - -	Calliandra sp. - -	Leguminosæ.
218	Jackwood - -	Artocarpus integrifolia -	Artocarpeæ.
219	Chigoewood - -	Bravaisia floribunda -	Acanthaceæ.
220	- - - -	Tabernæmontana - -	Apocyneæ.
221	- - - -	- - - -	Myrsineæ.
222	Supple Jack -	Serjania sp. - -	Sapindaceæ.

VICTORIA, AUSTRALIA.

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DIVISION I.—FINE ARTS.

SECTION 1.—OIL PAINTINGS.

Guerard, John Eugene Von, Gipps Street, East Melbourne—
1. "Rocks off Cape Woolomai, Phillip Island."
2. "Summit of Mount Kosciusko, Australian Alps."

SECTION 2.—PHOTOGRAPHS.

Bardwell, Wm., Ballarat—
3. Photographic views of Ballarat and district.
Bock, Alfred, Foster Street, Sale—
4. Photographic views of Sale and district.
Carolin, J. P., Kyneton—
5. Photographic views of Kyneton and district.
Colac Shire Council, Colac—
6. Photographic views of Shire of Colac.
Cornell, F., Bairnsdale—
7. Photographic views of Bairnsdale and district.
Harvey and Dimden, Geelong—
8. Photographic views of Geelong.
Intercolonial Exhibition, Commissioners of, Melbourne
9. Photographic views of the colony.
Koroit Borough Council, Koroit—
10. Photographic views of Borough of Koroit.
Lands Department, Melbourne—
11. Photographic views of Melbourne, by John Noone.
Moser, H., Daylesford—
12. Photographic views of Creswick and Daylesford.

VICTORIA.

Newtown and Chilwell Borough Council, Geelong—
13. Photographic views of the borough of Newtown and Chelwell.
Norton, John, Geelong—
14. Photographic views of Geelong and neighbourhood.
Public Library, Trustees of, Melbourne—
15. Photographs of the Dresden Gallery, bound, photographed by John Noone, Public Lands Department.
Public Works, Inspector-General of, Melbourne—
16. Photograph of the Melbourne Post Office.
17. Photograph of the Royal Mint, Melbourne.
Sandhurst City Council, Sandhurst—
18. Photographic views of the city of Sandhurst.
Strathfieldsaye Shire Council, Strathfieldsaye—
19. Photographic views of the Shire of Strathfieldsaye.

SECTION 3.—MISCELLANEOUS.

International Exhibition, Commissioners of, Melbourne—
20. Victorian sovereigns and half sovereigns, coined at the Royal Mint, Melbourne.
21. Catalogue of the models in the National Museum, Melbourne.
22. Volume of newspapers published in Victoria.
23. Volume of wood engravings, published in Victoria.
24. The Land Act of Victoria, 1869.
25. The census of Victoria.
26. Report of the Board of Education.
Lands Department, Melbourne—
27. Maps of the colony of Victoria.
28. Geodetic plans of the colony of Victoria.
Public Library, Melbourne—
29. Catalogue of the Public Library, 2 vols.
30. Catalogue of the Industrial and Technological Museum.
Wittber, August, Gipps Street East, Melbourne—
31. Australische Deutsche Zeitung.

DIVISION II.—MANUFACTURES.

SECTION 1.—WOOLLEN MANUFACTURES.

Gray, Alexander and Co., Albion Woollen Mills, Geelong—
32. Woollen tweeds, manufactured at Geelong.
33. Woollen shawl, manufactured at Geelong.
Victorian Woollen Company, Geelong—
34. Woollen tweeds, manufactured at Geelong.
35. Woollen shawls, manufactured at Geelong.

SECTION 2.—STEEL MANUFACTURES.

Maclean, Angus, Little Bourke Street, Melbourne—
36. Ornamental Zinc Work.
Major, James, 82, Collins Street West, Melbourne—
37. Bell cast from the iron manufactured by the Ilfracombe Iron Company.

SECTION 3.—AGRICULTURAL.

Class 1.—Machinery.

Tynan, John, Ballarat—
38. Double-wheel plough.

Class 2.—Dairy.

Mathews, William, Coghill's Creek—
39. Cheese.
Watson and Paterson, Bourke Street West, Melbourne—
40. Hams.
41. Bacon.

Class 3.—Grain, Cereals, and Pulse.

Buckley, Edward, Newbridge—
42. Wheat.
Burston, S., and Co., 123, Flinders Street East, Melbourne—
43. Barley.
Goulburn Shire Council, Goulburn—
44. Wheat.
Matthews, William, Coghill's Creek—
45. Oats.
46. Red straw wheat.

Class 4.—Roots, Fruits, and Seeds.

International Exhibition (Commissioners of), Melbourne—
Facsimiles of Victorian-grown fruits, consisting of the citrus or orange tribe, cherries, figs, pears, strawberries, plums, mulberries, and loquats, viz.:
47. Small-fruited shaddock.
48. West Indian lime.
49. Citron.
50. Cole's seedling citron.
51. Lemon.
52. Wild Lemon.
53. Persian sweet lemon.
54. Bergamot.
55. Siletta orange (No. 1).
56. St. Michael's orange.
57. Teneriffe orange.
58. Poor man's orange.
59. Blood orange.
60. Seville orange.
61. Mandarin orange.
62. Cluster orange.
63. Five-quartered orange.
64. Siletta orange (No. 2.)
65. Parramatta orange.
66. Twyford Bigarreau cherry, a Victorian seedling.
67. Clio cherry, a Victorian seedling.
68. Monarch cherry, a Victorian seedling.
69. Rockport Bigarreau cherry.
70. Cole's early black Guigne cherry, a Victorian seedling
71. Hero cherry, a Victorian seedling.
72. Black Bigarreau cherry.
73. Florence cherry.
74. Governor Wood cherry.
75. Ohio beauty cherry.
76. Bigarreau Monstrueux de Mozel cherry.
77. Black Tartarian cherry.
78. Cole's No. 1 cherry, a Victorian seedling.
79. Bigarreau Napoleon cherry.
80. Black heart cherry.
81. Scarlet Bigarreau cherry.
82. Turkey Bigarreau cherry.
83. White heart cherry.
84. St. Margaret cherry.
85. Rheine Hortense cherry.
86. Downton cherry.
87. Sparhawk's honey cherry.
88. Aston cherry.
89. St. Margaret cherry (No. 2 sample).
90. Florence cherry (No. 2 sample).
91. La Marguerite cherry.
92. De L'Archipel fig.
93. St. Dominique Violetta fig.

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94. St. Dominique Blanche fig.
95. Brunswick fig.
96. Citron de Carmes pear.
97. Doyenne D'Ete pear.
98. Trollope's Victoria strawberry.
99. Trollope's Victoria strawberry (No 2 sample).
100. St. Etienne plum.
101. Yellow cherry plum.
102. Cherry plum.
103. Damson prune plum.
104. Blue violet plum.
105. Early admirable plum.
106. Early Orleans plum.
107. Pricoce de Tours plum.
108. Early rivers plum.
109. Angelina Burdett plum.
110. Peach plum.
111. Black mulberry.
112. Black mulberry (Morin Moretti).
113. Loquats.

SECTION 4.

Class 1.—*Chemicals.*

Bosisto, Joseph, Richmond—

Chemical and pharmaceutical preparations from Australian preparations :

Eucalyptus Gums.—Globulas species, or Blue gum.

114. Ol. Eucalypti globuli; C 12, H 40, O.—Therapeutic uses: antiseptic, useful in putrid fevers and fœtid suppurations ; also has been successfully employed for embalming.
115. Liquor Eucalypti globuli, possesses valuable antiperiodic properties. In China it is stated to counteract malaria, without exerting the prejudicial effects of quinine on the nervous system ; recommended also in cases of chronic bronchitis, catarrh of the stomach, &c.
116. Eucalyptol C 12, H 20, O, for inhalation. Therapeutic uses: antiseptic, stimulant.
117. Tinctura Eucalypto globuli. Therapeutic use: tonic.
118. Foliæ, prepared carefully for export. Therapeutic use: cataplasm.

Eucalyptus Amygdalinæ Odorata.

120. Ol. Eucalypti amygdalinæ odorata. The eucalyptus oil of commerce, a volatile oil of a sweet aromatic aroma, and possessing a clean basic odour; it yields up its own identity on the addition of the more costly ottos in consonance with it, renders its utility in the employment of scenting soaps to be something considerable. Sp. grav. O.
121. Liquor Eucalypti amygdalinæ. Its properties similar to the globuli, but weaker.
122. Tinctura Eucalypti amygdalinæ. Therapeutic use: antiseptic; tonic.
123. Gum Eucalypti amygdalinæ. Therapeutic use: astringent.
124. Foliæ, prepared carefully for export in the form of an infusion 1 in 4; a good disinfectant.

Eucalptus Oleosa, or *Mallee Scrub.*

126. Eucalyptus oleosæ. This product is known in commerce under the name of "Oleosa," to avoid error with the other volatile oils of the Eucalypti. This oil is a powerful solvent, deserving the special notice of varnish manufacturers. It is stated that varnish made with Oleosa, in the place of turpentine, does not "bloom." It is twice the price of turpentine. The supply is unlimited.
127. Ol. Eucalypti fissilis.
128. Ol. Eucalypti fabrorum.
129. Ol. Eucalypti Stuartiana.

These three oils are exhibited for the purpose of showing the different characteristics existing in such products from the Eucalypti. They are not commercial.

130. Gummi sideroxylon, or iron bark.
131. Gummi amygdalinæ, or peppermint bark.
132. Gummi rostrata, or red gum bark.
133. Gummi oderata.
134. Gummi xanthorrhœa, or grass-tree.
135. Ol. Melaleuca ericifolia, or tea-tree oil.
136. Ol. Melaleuca gemistifolia.

Atherosperma moschata, or *Native Sassafras Bark.*

138. Ess. Ol. Atherosperm. Mosch. Therapeutic use: diaphoretic, dimetic, and sedative. It exerts a specific lowering influence on the heart's action.
139. Extract Atherosperm. Mosch. Tonic.
140. Atherospermini. Tonic.
141. Acacia decumens, or wattle-tree.
142. Essentia, or wattle perfume.
143. Opium, from Papaver somnifera, yielding 10 per cent. morphia. Grown in Gipps Land, on the farm of G. and A. Turpin, under the direction of the exhibitor. Grown annually as an article of commerce, and much sought after.
144. Ol. Mentha peperita, or fine oil of peppermint. Grown in Gipps Land, on the farm of G. and A. Turpin, and distilled by the exhibitor. Grown annually, and in increased quantity, as an article of commerce.
145. Ol. Mentha sativa, or spearmint. Grown at Mount Macedon, and distilled by the exhibitor.

Lucas, Robert, Colac—
146. Grass-tree gum, in its crude state.

Roff & Co., 87, Flinders Lane East, Melbourne—
147. Sullivan's hydrated double chloride of calcium and aluminum. Prepared from the crystals, non-poisonous and inodorous.
148. Sullivan's lotion. Prepared from the crystals.
149. Sullivan's disinfectant powder. Antiseptic, disinfectant, and deodorant.

Class 2.—Groceries.

Levi, Nathaniel, 32, Collins Street West, Melbourne—
150. Victorian beetroot sugar.

Lewis and Whitty, Charles Street, Fitzroy, Melbourne—
151. Washing blue.

Class 3.—Preparations of Food.

Australian Meat-Preserving Company, Market Buildings, Melbourne—
152. Preserved meats, consisting of corned beef, roast beef, preserved beef, preserved mutton, ox tongues, sheeps' tongues, legs of mutton, roast goose, roast duck, soup and bouilli, kidney soup, ox-tail soup.

Cooper and Payne, Saltwater River, Melbourne—
153. Roast beef, preserved by the patent syphon vacuo process.
154. Spiced beef, preserved by the calcium bath process.
155. Ox-tail soup.

Little, John, Mount Ararat Meat-Preserving Works, Ararat—
156. Preserved meats, made by the vacuo process.

Melbourne Meat-Preserving Company, Melbourne—
157. Preserved meats, consisting of boiled mutton, spiced beef, boiled beef, soup and bouilli, calves' head and bacon, ox tongues, roast mutton, corned beef, sheeps' tongues, seasoned roast mutton, calves' heads, mock-turtle soup, Julienne soup, gravy soup, and stewed kidneys.

Victoria Meat-Preserving Company, 118, Market Street, Melbourne—
158. Preserved meats and soups.

Western Meat-Preserving Company, Colac—
159. Preserved meats, consisting of beef, rabbits, kangaroo, game, and poultry.

Bencraft, George, & Co., Little Flinders Street, Melbourne—
160. Maize meal.

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Hagenauer, F. A., Ramahyuck Mission Station, Lake Wellington—
161. Arrowroot, grown at the Ramahyuck Aboriginal Mission Station, Lake Wellington, Gippsland.
Ramsden, Samuel, Carlton—
162. Flour.
Smith and Son, 102, Lonsdale Street East, Melbourne
163. Charcoal biscuits.
Stewart, M., & Co., Richmond, Victoria—
164. Maizena, manufactured at Richmond.
165. Starch, manufactured at Richmond.
Zorn, Edward, Oakleigh, near Melbourne—
166. Tomato sauce.

SECTION 5.—WINES AND SPIRITS.

Class 1.—*Wine.*

Best, Joseph, Great Western—
167. White wine, light, dry, made from Muscat, Chasselas, and Tokay grapes; vintage 1871.
168. White wine, light, dry, made from White Hermitage, Chasselas, and Reisling grapes; vintage 1871.
169. White wine, made from Sauvignon grapes; vintage 1871.
170. Red wine, light, made from Hermitage and Frontignac grapes; vintage 1870.
Bruhn Brothers, Emu Creek, Sandhurst—
171. White wine, light, made from Reisling and Pineau Blanc grapes; vintage 1866.
172. White wine; vintage 1871.
Castella, Hubert De, Yering—
173. White wine, light, made from Chasselas grapes; vintage 1869.
174. Red wine, full-bodied, made from Sauvignon grapes; vintage 1871.
175. Red wine, light and dry, made from Hermitage grapes; vintage 1869.
Crippa, Fabrizzio, Hepburn—
176. Red wine, full-bodied, made from Burgundy grapes; vintage 1871.
177. Red wine, light, made from Hermitage grapes; vintage 1870.
Davies, John, Moonee Ponds—
178. White wine, light, made from various grapes; vintage 1869.
Fallon, James T., Albury—
179. Brown wine, made from Muscat grapes.
180. Dark wine, dry, made from Burgundy grapes; vintage 1867.
181. White wine, dry, made from Reisling grapes; vintage 1862.
182. Brown wine, made from brown Muscat grapes.
183. White wine, made from Verdeilho grapes.
Fick, H. K., Campaspe—
184. Red wine, full-bodied, made from Mataro grapes; vintage 1871.
185. Red wine, full-bodied, made from Hermitage grapes; vintage 1871.
Francis, J. G., Sunbury—
186. White wine, full-bodied, made from Gouais grapes; vintage 1869.
187. Red wine, full-bodied, made from Hermitage grapes; vintage 1867.
188. Red wine, full-bodied, made from Hermitage grapes; vintage 1866.
Grosse, Frederick, Sandhurst—
189. White wine, light, made from Reisling grapes; vintage 1870.
190. Red wine, light, made from Carbinet Sauvignon grapes; vintage 1870.
191. Red wine, full-bodied, made from Hermitage grapes; vintage 1868.
Heine and Greiffenhagen, Strathfieldsaye, near Sandhurst—
192. White wine, full-bodied, made from Verdeilho grapes; vintage 1869.
193. Red wine, full-bodied, made from Hermitage grapes; vintage 1871.
194. Red wine, full-bodied, made from Carbinet Sauvignon grapes; vintage 1869.
Heine, August, Sheepwash, Sandhurst—
195. White wine, light, made from Reisling grapes; vintage 1868.

Hope, R. C., Lynnburn, Geelong—
196. White wine, light, made from Reisling and Gouais grapes; vintage 1871.
197. White wine, made from Reisling grapes; vintage 1871.
Johnston, J. S., Sunbury—
198. Red wine, full-bodied, dry, made from Hermitage grapes; vintage 1869.
Jung, Otto, Chinaman's Creek, Castlemaine—
199. Red wine, full-bodied, made from Hermitage grapes; vintage 1869.
Maplestone, Charles, Ivanhoe, Heidelberg—
200. White wine, light, made from large and small Reisling grapes; vintage 1868.
201. Red wine, light, made from Hermitage grapes; vintage 1870.
Pohl, Carl, Strathfieldsaye, near Sandhurst—
202. White wine, full-bodied, made from Verdeilho grapes; vintage 1871.
203. Red wine, full-bodied, made from Hermitage grapes; vintage 1871.
204. White wine, full-bodied, made from Verdeilho grapes; vintage 1870.
205. Red wine, full-bodied, made from Hermitage grapes; vintage 1869.
206. Red wine, full-bodied, made from Hermitage grapes; vintage 1869.
Schroeder, Ehrenfield, Chinaman's Creek, Castlemaine—
207. White wine, full-bodied, made from Reisling grapes; vintage 1871.
208. White wine, full-bodied, made from Chasselas grapes; vintage 1870.
209. Red wine, full-bodied, made from Hermitage and Carbinet grapes; vintage 1870.
Schmidt, Franz, Berwick—
210. White wine, full-bodied, made from Reisling grapes; vintage 1866.
Smith, George S., Wahgunyah—
211. Red wine, sweet, made from Muscatel and Shiraz grapes; vintage 1869.
Trouette and Blanchpied, Great Western—
212. Red wine, full-bodied, made from black cluster grapes; vintage 1871.
Vettler, John, Echuca—
213. White wine, light, made from white Morillion grapes; vintage 1871.
214. White wine, light, made from Reisling grapes; vintage 1871.
215. White wine, light, made from Gonais grapes; vintage 1871.
216. Red wine, made from Hermitage grapes; vintage 1870.
217. Red wine, full-bodied, made from Grenache grapes; vintage 1870.
218. Red wine, full-bodied, made from Carbinet Sauvignon grapes; vintage 1871.
Weber, Jacob, Leigh Road—
219. Red wine, full-bodied, made from Hermitage grapes; vintage 1871.

Class 2.—*Spirits.*

Castella, Hubert de, Yering—
220. Brandy.

DIVISION III.—SCIENTIFIC INVENTIONS AND NEW DISCOVERIES.

International Exhibition, Commissioners of, Melbourne—
221. Abstract of English and colonial specifications relating to the preservation of food.
222. Transactions and proceedings of the Royal Society of Victoria.
223. Abstracts and specifications of patents in Victoria.
224. Patents and patentees in Victoria. 5 vols.

DIVISION IV.—RAW PRODUCE.

SECTION 1.—LEATHER.

Davies, E., & Son, Weston Street, Brunswick—
225. Tanned and curried calfskins.

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Fox, John, & Co., Yarra Bank, Emerald Hill, Melbourne—
226. White leather for saddlery.
Michaelis, Hallenstein, & Co., 30, Lonsdale Street East, Melbourne—
227. Side of crop leather.
228. Butt leather.
229. Side of kip leather.
230. Side of black harness leather.
231. Side of brown harness leather.
232. Large, medium, and small calfskins.
233. Side of waggon leather.
234. Black kangaroo leather.
235. Brown kangaroo leather.
236. Cordovan leather.

SECTION 2.—WOOL.

Currie, J. L., Larra, Lismore—
237. Merino wool (ewe), about 350 days' growth.
Dowling, Thomas, Jellalabad, Darlington—
238. Fleeces (ewe) wool, hot-water washed, 350 days' growth.
Goldsbrough, R., & Co., Bourke Street West, Melbourne—
239. Fleece wool, washed, from the western district of Victoria.
240. Fleece wool, washed, from the western district of Victoria.
241. Fleece wool, washed, from the western district of Victoria.
242. Lambs' wool, washed, from the Murray district.
243. Fleece wool, washed, from the western district of Victoria.
244. Fleece wool, washed, from the Murray district.
245. Fleece wool, washed, from the western district of Victoria.
246. Fleece wool, washed, from the western district of Victoria.
247. Fleece wool, greasy, from the Murray district.
248. Fleece wool, greasy, from the Murray district.
249. Fleece wool, greasy, from the western district of Victoria.
250. Fleece wool, greasy, from the Upper Murray district.
Robertson, A. S., Geelong—
251. Merino wool, bred in-and-in for 15 years, on the dry plains of Lismore.
252. Sample case of Merino wool, ditto.
Russell, Thomas, Wurrook, Rokewood.
253. Fleece wool, from young sheep, skirted in grease.
Russell, Philip, Carngham—
254. Wether wool, hot-washed.
Russell, Thomas, & Co., Barunah Plains, Hesse.
255. Fleece wool, hot-water washed, 375 days' growth.

SECTION 3.—WOOD.

International Exhibition, Commissioners of, Melbourne—
256. Myrtlewood.
257. Sassafras wood.
258. Dogwood.
259. Section of mountain ash, from the Black Spur, Watts River.
260. Pepper tree.
261. Victorian blackwood.
262. Long wattle bark.
263. Ground wattle bark.
264. Blackwood cabinet, for sewing machine, manufactured by Alcock & Co., Melbourne.
Industrial and Technological Museum, Melbourne—
265. Eucalyptus globulus, or Blue gum.
266. Eupomatia laurina.
267. Eucalyptus Stuartiana, or White gum.
268. Hedycarya Cunninghamii.
269. Eucalyptus obliqua, or Stringy bark.
270. Eucalyptus melliodora, or Box.

271. Eucalyptus fissilis, or Messmate.
272. Acacia melanoxylon, or Blackwood.
273. Aster argophyllus, or Musk.
274. Eucalyptus rostrata, or Red gum.
275. Eucalyptus sideroxylon, or Iron bark.
276. Acacia implexa.
277. Eucalyptus albens, or White box.
278. Eucalyptus corymbosa, or Bloodwood.
279. Eucalyptus goniocalyx, or Spotted gum tree.
280. Eucalyptus longifolia.
281. Tristania laurina.
282. Santalum acuminatum, or Quandong.
283. Exocarpus cupressiformis, or Native cherry.
284. Aster argophyllus, or Musk.
285. Casuarina suberosa, or Weeping she-oak.
286. Fagus Cunninghamii, or Native beech.
287. Callitris verucosa, or Desert pine cypress.

SECTION 4.—ORES AND COAL.

Class 1.—*Ores.*

Costerfield Gold and Antimony Company, 52, Elizabeth Street, Melbourne—
288. Sulphide of antimony, from the Costerfield Mine.
289. Oxide of antimony, from the Costerfield Mine.

Major, James, 82, Collins Street West, Melbourne—
290. Iron ore and iron manufactured from the ore, by the Hfracombe Iron Company.

Mining Department, Melbourne—
291. Galena from the Buchan.
292. Antimony from Whroo.
293. Iron ore.

United Ovens Gold and Tin Mining Company—
294. Tin ore.
295. Statistics of the United Ovens Gold and Tin Company's Mine.

Class 2.—*Coal.*

Mining Department, Melbourne—
296. Coal from Cape Patterson.

SECTION 5.—MINERALOGICAL AND GEOLOGICAL SPECIMENS.

Ajax Gold Mining Company, Castlemaine—
297. Samples of quartz from the Ajax Mine.

Band of Hope and Albion Consols Company, Ballarat—
298. Washdirt from No. 4 shaft, 220 feet from the surface.
299. Quartz from No. 4 shaft, 300 feet from the surface.
300. Statistics of the Band of Hope and Albion Consols Mine.

Brache, Jacob, Collins Street West, Melbourne—
301. Description of the Eldorado Gold and Tin Mines, Beechworth.
302 Transactions of the Mining Institute of Victoria.

Great Extended Hustler's Reef Quartz Mining Company, Sandhurst—
303. Auriferous quartz taken from a depth of 300 feet below the surface.
304. Statistics of the Great Extended Hustler's Reef Company's Mine.

Hope Mining Company, Wood's Point, Gipps Land—
305. Average samples of quartz as raised from the mine.
306. Samples of quartz, antimony, auriferous pyrites, granite, and diorite.
307. Statistics of the Hope Mining Company's Mine.

International Exhibition, Commissioners of, Melbourne—
308. Facsimilies of the nuggets "Welcome" and "Lady Barkly."

Mining Department, Melbourne, per R. Brough Smyth, F.G.S., Secretary for Mines—

Geological Specimens, Tertiary or Cainozoic Group:
310. Fossils and rocks from the upper tertiary or pliocene formation, from the vicinity of Melbourne.

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311. Fossils and rocks from the upper tertiary or pliocene formation, from the Royal Park, near Melbourne.
312. Fossils and rocks from the upper tertiary or pliocene formation, from the leaf beds of Daylesford.
313. Fossils and rocks from the upper tertiary or pliocene formation, from the vicinity of Melbourne.
314. Fossils and rocks from the middle tertiary or miocene formation, from the neighbourhood of Geelong.
315. Fossils from the lower tertiary (oligocene) formation, from near Schnapper Point.

Secondary or Mesozoic Group :

316. Fossils and rocks from the oolitic (carbonaceous) formation, from Strzelecki's Range.
317. Rocks from the oolitic (carbonaceous) formation, from Western Point.

Primary or Palæozoic Group :

318. Rock from the upper palæozoic (carboniferous) formation, from Mount William.
319. Rock from the upper palæozoic (carboniferous) formation, from Mount Abrupt.
320. Rock from the Devonian formation, from Buchan, Gipps Land.
321. Fossils and rocks from the upper silurian formation, from the Upper Yarra.
322. Fossils and rocks from the upper silurian formation, from the vicinity of Melbourne.
323. Fossils and rocks from the lower silurian formation, from Daylesford.
324. Fossils and rocks from the lower silurian formation, from Sandhurst.

Crystalline Group :

325. Specimens from the crystalline rocks, or metamorphic, from Gipps Land.

Igneous and Plutonic Group :

326. Rocks from the newer volcanic formation, from the vicinity of Melbourne.
327. Rocks from the older volcanic formation, from the vicinity of Melbourne.
328. Rock from the trap formation.
329. Rock from the granite formation, from Clunes.
330. Rock from the granite formation, from Maryborough.
331. Rock from the granite formation, from Beechworth.
332. Rock from the granite formation, from Beechworth.
333. Syenitic granite, from the granite formation of Gabo Island.
334. Sketch of a new geological map of Victoria.

Mineralogical Specimens.—Gold :

335. Auriferous quartz. Quartz of this character is called by the miners "honeycomb quartz." From the North Star Mine, Energetic Reef, Lauriston. The specimen was got from the water line at a depth beneath the surface of 110 feet. The reef was 22 feet in width, and averaged a yield of 1 oz. 10 dwts. of gold to the ton of quartz.
336. Auriferous quartz, with iron pyrites. From the Golden Bar Reef, which is 18 inches in width at the surface, and 4 feet wide at 50 feet in depth. This reef is situated in Camp Creek, two miles from Russell's Creek.
337. Auriferous quartz and iron pyrites. Got from a lode 8 feet in width, which is situated near Mount Egerton.
338. Auriferous quartz tailings, from Castlemaine.
339 Gold and native copper. Portion of a sample obtained from a dish of dirt taken out of the Egerton Consols shaft, at a depth of 290 feet from the surface. From Mount Egerton.
340. Auriferous arsinical pyrites, from the Great Extended Hustler's Reef Company's Mine at Sandhurst. It was got from 500 feet in depth beneath the surface. From 70 tons of this ore 173 ozs. of gold were extracted. The gold was very fine.
341. Auriferous slate and iron pyrites, and galena. When the reef quartz "tails out," this formation takes its place between the walls of the vein.

Depth from the surface at which this specimen was obtained, 240 feet; width of the formation, 3 feet 6 inches; average yield of gold per ton, 5 ozs. 12½ dwts. From the Great Extended Company's Mine, Eaglehawk, Sandhurst.

342. Auriferous cement, or washdirt, from the Alston and Weardale Company's Mine at Ballarat.

343. Auriferous cement, found at from 60 to 70 feet beneath the surface, overlying "pipeclay" in wet ground, at Talbot.

344. Auriferous iron pyrites. It occurs in seams of the silurian slate rock, in a similar manner to quartz veins or leaders, and in the drift overlying the bed-rock. It is said to be found in large quantities to the south of the prospecting claim at Foster, Stockyard Creek. An assay of it for gold gave results equal to 19 dwts. 4 grs. per ton.

Silver:

345. Chloro-bromide of silver, from St. Arnaud.

346. Argentiferous arsenical pirites, from Eldorado, near Beechworth.

347. Argentiferous galena. It contains 18 ozs. 5 dwts. 20 grs. of silver per ton of ore. From a lode situated at the junction of the Dedduck River and the Snowy River, Gipps Land.

348. Argentiferous galena and quartz. An assay of the ore gave 79 per cent. of lead, and 27 ozs. 8 dwts. of silver per ton. Obtained from an extensive reef near Berlin at 20 feet in depth. The strike in the reef is east and west.

349. Argentiferous sulphide of lead. One portion of the sample yielded 23 ozs. 7 dwts. 18 grs. of silver per ton; another portion gave 7 ozs. 1 dwt. per ton. From Buchan, Gipps Land.

Tin:

350. Black oxide of tin and iron pyrites. These minerals occur on the faces of the specimens, which show sections of their stanniferous veins. From the vicinity of Beechworth.

351. Tin ore in decomposed granite. From Beechworth.

352. Tin ore. Obtained from the bed of the Koetong Creek, Upper Murray River.

353. Stanniferous washdirt. From the Koetong Creek, Upper Murray River.

354. Tin ore, with which is associated gold and tourmaline. From the bed of the Latrobe River.

Copper:

355. Native copper in silurian shale. The copper occurs in nearly all the faces of the joints and fissures, and especially where there are thin veins of quartz. It is probably derived from the decomposition of copper pyrites. There are traces of oxide and carbonite of copper. Got from 500 feet in depth beneath the surface; 30 feet of shale of a similar character to this sample have been cut through. The strike of the shale is about 20° west of north; it has scarcely any underlie. From the Flying Scud Mine, Mount Egerton.

356. Green and blue carbonate of copper. From the Thomson River Copper Mine, Gipps Land.

Antimony:

357. Antimony regulas. From Heathcote.

358. Antimony, native. From a lode at Maldon.

359. Sulphide of antimony. From Costerfield, near Heathcote.

360. Sulphide and oxide of antimony. From Blackwood.

361. Sulphide and oxide of antimony. From Balaclava Hill, Whroo.

362. Antimony ore. From an auriferous lode. It was got at 70 feet beneath the surface; the average width of the vein was 12 inches, depth of the water level about 150 feet; the strike of the lode was north and south. From the Imfer Reef, Coy's diggings, near Whroo.

363. Cervantite (oxide of antimony). From a lode at Coimadai.

364. Oxide of antimony. Broken from the reef at a depth of 50 feet from the surface. This is an antimony reef, and it strikes east and west. It is irregular in width, being sometimes as much as 2 feet and diminishing to a mere thread. From Stockyard Reef, Whroo. (Attached to the antimony ore is some of the bounding rock of the vein).

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365. Ferruginous antimony ochre. Upon assay it gave 31·8 per cent. of antimony. It was got from the foot wall of the lode in the 60 feet level at Ringwood, near Melbourne.

366. Antimony and iron ores in quartz. The greater part of the antimony is in the crystalline parts of the specimen and in the joints. From a reef which contains gold. The specimen was got from 87 feet in depth in a cross reef at the antimony mines of Ringwood. The lode was 18 inches in thickness.

Zinc:

367. Blende (sulphide of zinc), with small crystals of iron pyrites. An assay for silver yielded results equal to 3 ozs. 5 dwts. of silver per ton. From the 400 feet level in the Western Reef, Chrysolite-Hill, St. Arnaud. This reef is 4 feet in width.

Lead:

368. Galena (sulphide of lead) with Bleeschwuf (antimonial galena). The purer portion of the sample gave about 72 per cent. of lead. The poorer part containing most antimony, 65 per cent. of lead, and 7 ozs. of silver per ton of ore. The other portion of the sample gave 63 per cent. of lead and 15 ozs. of silver per ton of ore. From Gipps Land.

369. Galena. From the Buchan Lead and Silver Mine at Buchan, Gipps Land.

370. Galena. Sulphide of lead, with sulphide of antimony. One part of the sample yielded 23 ozs. 7 dwts. 18 grs. of silver per ton and 48 per cent. of lead; another portion yielded 20 per cent. of lead and 7 ozs. 1 dwt. of silver per ton of ore. From Buchan.

371. Galena, with pyrites, from a lode at Percydale. The reef is from 3 feet to 3 feet 6 inches in width, and well defined. Its strike is N. 35 deg. W., and its dip about 63 deg. S.W. An analysis of a sample of ore from this vein gave—lead, 20 per cent.; iron, 30 per cent.; sulphur, 41 per cent.; zinc, 3 per cent., &c.

Cobalt:

372. Cobalt, with manganese ore. From Gipps Land.

Manganese:

373. Manganese ore. Variety of wad. A qualitative analysis gave manganese, iron, alumina, lavic, and baryta. In the purer portions the manganese amounts to 40 per cent. of the whole, whilst in other parts the composition is that of an earthy brown iron ore, with only traces of manganese. From a vein at Clifton Creek, about five miles from Bairnsdale, the lode appears, to judge from surface indication, to be about 3 feet or 3 feet 6 inches in thickness.

374. Black oxide of manganese. From Chiltern, where it is said to be plentifully distributed through the *débris* of the gold workings on Chiltern *lead.*

375. Black oxide of manganese. From Skipton Diggings, near Linton.

Molybdenite:

376. Molybdenite (sulphuret of Molybdenum). From Gipps Land.

Iron:

377. Micaceous specular iron ore. Obtained from within a mile of the north-west end of Lake Tyers, in Gipps Land. It is said to occur in immense quantities.

378. Micaceous iron ore, with quartz. From Mount Nowa Nowa, Boggy Creek, Gipps Land.

379. Iron ore, from the Royal Park, near Melbourne.

380. Titaniferous iron sand. The sand is found to contain small crystals of sapphires, zircons, &c. From the Upper Yarra.

381. Titaniferous iron sand. It contains small fragments of zircons, topaz, and almandine garnets. From Turner's Creek, near Sassafras Creek.

382. Titaniferous iron sand, containing small fragments and crystals of sapphire, corundum, fibrolite, topaz, and quartz. From a creek in the Dandenong Ranges, about 22 miles distant from Melbourne.

383. Titaniferous iron ore, often mistaken for stream tin by inexperienced miners. From Spring Creek, Beechworth.

384. Magnetic iron sand. It contains about 50 per cent. of iron. From the Whipstick, near Sandhurst.
385. Magnetic iron sand (waterworn). Some of the fragments are strongly magnetic, having the power of attracting one another. Got from a puddler's tailings heap, in the alluvial gold-mining workings at Kangaroo Flat, Sandhurst.
386. Iron pyrites in slate and quartz, from Sandhurst.
387. Iron pyrites in slate, from Fryer's Creek.
388. Vivianite (phosphate of iron), from Sarsfield, Gipps Land.
389. Pharmacosiderite, obtained from the centre of Robinson's Reef, at Clunes, which reef is 6 feet in thickness, at a depth of 300 feet.
390. Wolfram, from near Linton.

Coal:

391. Coal from Strzelecki's Ranges.
392. Coal found by a prospector near Brandy Creek, Pakenham.
393. Coal from the Hoddle Range, near Stockyard Creek.

Lignite:

394. Lignite shale. When strongly heated the shale takes fire and burns with a yellow, smoky flame, and leaves a buff-coloured ash. An analysis gave—

Volatile matter	31·82
Carbon	8·87
Ash	59·31
	100·00

The water is included in the volatile matter. Obtained from near Campbelltown, Glenlyon, at 20 feet beneath the surface.

Slates:

395. Roofing slate, containing grapholite. Found at about 20 feet in depth, and about 30 feet above the Gisborne Creek. From a Gisborne quarry.

Magnesite:

396. Magnesite (carbonate of magnesia). From the Whipstick, near Sandhurst.
397. Magnesite, from Sandhurst.

Miscellaneous Minerals:

398. Silicate of alumina. Found overlying the drift and basalt. From the Mysterious Lead, parish of Amherst.
399. Epsomite (sulphate of magnesia), from the banks of Goodman's Creek, about three miles from Bacchus Marsh.
400. Aragonite in basalt, from Malmsbury.
401. Aragonite in basalt, from the quarries at Richmond.
402. Sapphires, garnets, agates, cornelian, and opal, from the head of the Worri Yaloak Creek, near Lilydale.
403. Zircons, tin ore, and quartz sand, with titaniferous iron sand, from Dry Diggings, near Daylesford.
404. Zircons, topaz, and almandine garnet fragments in titaniferous iron sand, from Turner's Creek, near Sassafras Creek.
405. Sapphires, zircons, schorl, &c., from the Magenta Tunnel, Italian Hill, Daylesford. The sample was obtained at 130 feet below the surface and 2,000 feet from the mouth of the tunnel.
406. Zircons, sapphires, &c., from the Ovens, and La Trobe Rivers.

Facsimiles of Gold Nuggets found in Victoria:

407. The "Beauty" nugget, weighed 242 ozs. 17¼ dwts. It was discovered at a depth of 9 feet from the surface in Kangaroo Gully, Bendigo, in the year 1858. The gold was 22·2⅞ carats fine.
408. The "Platypus" nugget weighed 377 ozs. 6 dwts. It was found in Robinson Crusoe Gully, Bendigo, in a pillar of earth of a deserted claim. The claim was situated in shallow alluvium, and the nugget was discovered in March 1861. The gold was 22·1⅛ carats fine.

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409. The "Viscount Canterbury" nugget was found in John's Paddock, Berlin Diggings, at a depth of 15 feet from the surface, on the 31st May 1870. It weighed 1,105 ozs. The gold was 23·3 carats fine.
410. The "Viscountess Canterbury" nugget was found on the 3d of October 1870 at Berlin. It was discovered at 6 feet 6 inches beneath the surface, and weighed 884 ozs. 10 dwts. The gold was 23·2⅝ carats fine.
411. Nugget (not named) found at Creswick in the Key Company's mine. It weighed 32 ozs., and was found in January 1871.
412. The "Precious" nugget was found on the 5th of January 1871, by a party of Chinese. It weighed 1,621 ozs. 2 dwts. The gold was 23·0½ fine. The nugget was discovered at 12 feet beneath the surface. Distinct impressions of quartz crystals cover its surface. It was found in Catto's Paddock, Berlin.
413. The "Kum Tow" nugget weighed 718 ozs. 5 dwts. It was found on the 17th April 1871, in Catto's Paddock, Berlin Diggings, at a depth of 12 feet 6 inches below the surface. It was found by a party of Chinese. The gold was 23·3 carats fine.
414. The "Needful" nugget was discovered at 12 feet beneath the surface, in Catto's Paddock, Berlin diggings, on the 10th May, 1871. It weighed 246 ozs. 16 dwts., and the gold was 23·3 carats fine.
415. Nuggets (not named) found in Bromfield Gully, Creswick, on the 12th and 8th August 1872. They weighed respectively 46 ozs. 15 dwts. and 24 ozs. 3 dwts., and were got at 100 feet beneath the surface.
416. Nugget (not named) found at Creswick in the Red Streak Lead on the 31st August 1872. It was discovered at 180 feet below the surface, and weighed 30 ozs. 1 dwt.
417. The "Welcome" nugget was found on the 11th June 1858, at 180 feet from the surface, at Bakery Hill, Ballarat. It weighed 2,195 ozs.

Rosales, Henry, Walhalla, Gipps Land—
418. Specimens of quartz from the Walhalla Gold Mining Company.
419. Photograph and statistics of the Walhalla gold mine.
420. Specimens of clay, slate, diorite, auriferous quartz, &c.

Rose of Denmark Gold Mining Company, Gaffney's Creek—
421. Specimens of diorite, auriferous quartz, slate, &c.
422. Bitterspar from the Rose of Denmark Company's mine.

Section 6.—Natural History.

Acclimatisation Society, Melbourne—
423. Silk cocoons.
424. Ostrich plumes from ostriches acclimatised by society.

French, Charles, Melbourne—
425. Victorian wood-boring insects (Coleoptera), collected near Melbourne.

Cohn & Co., 8, Hawke Street West, Melbourne—
426. Fur muffs and collarets of native cat, blue kangaroo, brown kangaroo, emu, grey opossum, and dyed opossum skins, manufactured by Cohn & Co.

International Exhibition, Commissioners of, Melbourne—
427. Collection of Victorian ferns.
428. Lyre birds' tails.
429. Proceedings of the Acclimatisation Society of Victoria.

Moss, George, Bourke Street West, Melbourne—
430. Skins of the brush kangaroo, common kangaroo, native bear, blue chinchilla opossum, black and white native cat, grey and white native cat, mountain wallaby, common wallaby, and bilbo.
431. Blue chinchilla rug, prepared by G. Moss.

National Museum, Trustees of, Melbourne—
432. Osphranter rufus, gigantic red kangaroo, male and female.
433. Dasyurus maculatus, native cat, male.
434. Phascolomys lasyorhinus, wombat.
435. Macropus fuliginosus, sooty kangaroo, male.
436. Macropus ocydromus, kangaroo, female.
437. Halmaturus walabatus, wallaby.

SECTION 7.—ABORIGINES AND ETYMOLOGY. VICTORIA.

Darke, D. H., Rowena Street, Richmond—
438. Models of aboriginal weapons, &c.
International Exhibition, Commissioners of, Melbourne—
439. Photographic portraits of the aboriginal natives of Victoria, photographed by Walter.
440. Casts of the skulls of the aboriginal natives of Victoria.
441. Charts of aboriginal languages, &c.

WEST AFRICA.

WEST AFRICA.

Some African cloths.
Models of African (native) hammers, &c.
Some prints of Sierra Leone.
A piece of malachite.
Flint implement.
Horse headstall, the shaking of which gives notice of horses approach.
Bridle and bit.
Riding shoe.
Gunpowder calabash.
Sia ban or pouches.
Mahomedan beads for prayers.
Net bag for carrying indigo balls.
Hat.
Looking slap case.
Arm rings made of broken bottles.
Strings used as braces.
Load binder.
Razor, tobacco knife, and waist knife.
Brass bracelets,—signs by which the worshippers of a god called "Osun" are known. This Osun is believed by the heathens to be the wife of Thunder.
Children's footring.
Do. gunstick (of brass).
Bell.
Smoking pipe.
1 jaguar rug with mounted head, value 18*l.* 18*s.*
1 muff, black monkey skin.
1 do. grey do.
1 stuffed rare Ichneumon.
4 Ashantee platters.
2 pairs do. sandals.
1 pair do. comb.
1 pair do. wallet.
1 dispatch bag.
6 Ashantee pipes.
6 do. weights and measures.
1 bundle pipe stems.
Minerals.
Gold bearing quartz from Wassau.
Peaweeds.
Ruff coral.
3 large Gold Coast shells.
Samples of small do.
6 brown Gold Coast shells.
12 rare shells.
2 rare Gold Coast beetles.
1 wild cat skin.

WEST AFRICA.

2 grey monkey skins.
3 black „
5 lesson boards as used in native schools.
Samples of—
Palm kernel oil.
Palm oil.
Bees wax.
Copal.
African cotton.
Ginger from West Coast.
Do. Sierra Leone.
Pod pepper.
Ground nuts.
Palm nuts.
Palm kernels.
Bean seeds.
Guinea seed.
Palm cake.

AWARDS.

COLONIAL AWARDS, VIENNA UNIVERSAL EXHIBITION, 1873.*

BAHAMAS.

BAHAMAS.

GROUP XXI.—*National Domestic Industry.*

Names.	Awards.
Bahama Islands Collective Exhibition (Group II.)	Honourable mention.
Evans, Mrs. Robert H.	Honourable mention.
Grant, Miss M. E.	Honourable mention.
Robertson, Mrs. E.	Honourable mention.

CAPE OF GOOD HOPE.

CAPE OF GOOD HOPE.

GROUP I.—*Mining, Quarrying, and Metallurgy.*

Mosenthal, Julius	Honourable mention.
Ochs, Brothers	Honourable mention.
Swinburn, John	Honourable mention.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

De Cloete (Cape Town)	Honourable mention.

GROUP III.—*Chemical Industry.*

Adler, N., & Co. (including Groups I. and II.)	Medal for progress.

GROUP IV.—*Substances of Food as Products of Industry.*

Bell, J. L.	Honourable mention.
Cloete, T. P.	Medal for merit.
Collison, Sons, & Co. (wines)	Medal for progress.
Cloete, Brothers, & Co.	Medal for merit.
Jameson & Co.	Honourable mention.
Russell & Co. (wines)	Medal for merit.

* As issued by the Austrian authorities.

AWARDS.

GROUP V.—*Textile Industry and Clothing.*

Names.	Awards.
Mosenthal, Julius (including Group II.)	Medal for merit.

GROUP X.—*Small Ware and Fancy Goods.*

Adler, N., & Co.	Medal for merit.

GROUP XVII.— *The Navy.*

Currie, Donald, & Co. (London)	Medal for merit.

CEYLON.

CEYLON.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Carey, Strachan, & Co.	Medal for merit.
Layard, C. P., & Co. (Fibres, Vanilla)	Medal for Merit.
Lunatic Asylum	Honourable mention.
Rajapaksa, J.	Honourable mention.
Rajapaksa, J.	Honourable mention.
Volkart, Brothers (including Group III.)	Medal for progress.
Wall & Co.	Medal for merit.

GROUP III. *Chemical Industry.*

Layard, C. P.	Medal for merit.

GROUP VI.

Müller, of Canada (Leather)	Medal of Merit.

JAMAICA.

JAMAICA.

GROUP IV.—*Substances of Food as Products of Industry.*

Soutar & Co. (cigars)	Medal for merit.

MAURITIUS.

MAURITIUS.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Horne, J.	Medal for merit.
Mauritius Wood Collection	Medal for merit.

GROUP IV.—*Substances of Food as Products of Industry.*

Ceylon Company Limited	Medal for merit.
D'Arifat	Medal for merit.
Flore Mauricienne	Honourable mention.
Grand Baie Estate	Honourable mention.
Hardt and de Bissy	Medal for merit.
Hewetson	Honourable mention.
Kœnig	Medal for merit.
Manes	Medal for merit.
Pellegrin, H.	Medal for merit.
Pitot, Hon. H.	Medal for progress.
Sornay, A.	Honourable mention.
Thierry, T.	Medal for merit.
Thomas	Honourable mention.
Trebuchet & Co.	Honourable mention.

AWARDS.

GROUP V.—*Textile Industry and Clothing.*

Names.	Awards.
Colony of Mauritius (Fibres)	Honourable mention.

GROUP XXVI.—*Education, Teaching, and Instruction.*

Meldrum, C., Royal Observatory	Medal for merit.

NEW SOUTH WALES.

NEW SOUTH WALES.

Sydney Meat Preserving Co.	Medal for progress.

NEW ZEALAND.

NEW ZEALAND.

GROUP I.—*Mining, Quarrying, and Metallurgy.*

Government of New Zealand (Geological and Mineralogical models)	Medal for merit
Haast, Julius (Canterbury Museum)	Medal for merit.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Anstey, G. A.	Honourable mention.
Bluett, J. G.	Medal for merit.
Chinery, Rangiora	Honourable mention.
Cunningham, P., & Co. (grain)	Honourable mention.
Dumerque and Place, Waikuku	Medal for merit.
Goulter, C. (New Zealand flax)	Medal for merit.
Lane, W. H. (grain)	Honourable mention.
Meek, J. and T.	Honourable mention.
New Zealand Agricultural Society (grain)	Honourable mention.
New Zealand Wood collection	Medal for merit.
Rogers, J. H.	Honourable mention.
Tosswill, J. N.	Honourable mention.
Wood, W. D.	Honourable mention.

GROUP III.—*Chemical Industry.*

Bœnicke	Honourable mention.
Brown and Campbell	Honourable mention.
Combes and Daldy	Honourable mention.
Henderson and McFarlane	Honourable mention.
Nattrass, Luke	Honourable mention.
Owen and Graham	Honourable mention.
Walker, R., & Co.	Honourable mention.

GROUP IV.—*Substances of Food as Products of Industry.*

Canterbury Meat Preserving Company	Medal for merit.
Caukwell, W. T., & Co.	Medal for merit.
Cunningham P., & Co.	Medal for progress.
Dornwell, A.	Honourable mention.
Gilmore, J.	Honourable mention.
Pannell, G.	Medal for merit.
Reeves & Co.	Medal for merit.
Trent, E. W.	Honourable mention.

GROUP V.—*Textile Industry and Clothing.*

Agent-General in England	Medal for merit.
Alford, H.	Honourable mention.
Auckland Patent Steam Rope Co.	Honourable mention.
Bevan and Sons	Honourable mention.
Brogden, James	Honourable mention.
Burns, A. J., & Co.	Medal for merit.
Canterbury Flax Association	Honourable mention.

GROUP V.—*Textile Industry and Clothing*—cont.

AWARD.

Names.	Awards.
Colonial Museum	Medal for merit.
Cooke, W.	Honourable mention.
Grant & Co.	Honourable mention.
Lennon, T.	Honourable mention.
Lockhardt, N. T.	Honourable mention.
Simons and Malcolm	Honourable mention.
Tarahora	Honourable mention.
Thorne, Cornelius	Medal for progress.
Webley Brothers	Medal for merit.
Webley Brothers, Nelson	Honourable mention.

GROUP VI.—*Leather and India-rubber Industry.*

Wilson, T. (Leather)	Honourable mention.

GROUP VIII.—*Wood Industry.*

Graham, Robert (Maori carvings)	Honourable mention.
Seuffert, Auckland	Honourable mention.

GROUP XXVI.—*Education, Teaching, and Instruction.*

Buller, Dr. W. Lawry	Honourable mention.
Lindsay, Dr. W. Lauder	Honourable mention.

QUEENSLAND.

QUEENSLAND.

GROUP I. *Mining, Quarrying, and Metallurgy.*

Government of Queensland (gold in raw state)	Medal for merit.
Gullard & Co., Tivoli Mines, Ipswich	Honourable mention.
Mort, W., & Co.	Honourable mention.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Collection of Tobaccos and Fibres (Botanic Gardens)	Medal for merit.
Hine, Miss (silk cocoons)	Honourable mention.
Queensland Wood Collection (A. Hodgson)	Medal for merit.
Simpson, Capt.	Honourable mention.
Wienholt Brothers	Medal for merit.
Yates, G.	Honourable mention.

GROUP III.—*Chemical Industry.*

Manning and Staiger	Honourable mention.

GROUP IV.—*Substances of Food as Products of Industry.*

Apps, Smith, & Co.	Medal for merit.
Brown, A. H.	Medal for progress.
Central Queensland Meat Company	Medal for merit.
Eaton, John	Medal for merit.
Government Penal Establishment	Medal for merit.
Johnston and Sons	Medal for merit.
Jordan, H.	Honourable mention.
Laurel Bank Company, Rockhampton	Honourable mention.
Mackenzie Brothers	Honourable mention.
Muir, R.	Honourable mention.
Nind, P. H.	Honourable mention.
Port Royal Mill	Honourable mention.
Ramsey Brothers	Medal for merit.
Robertson Brothers	Honourable mention.
Tooth, R.	Medal for progress.

AWARDS.

GROUP V.—*Textile Industry and Clothing.*

Names.	Awards.
Macpherson, A.	Medal for merit.
Weise, —	Medal for merit.

GROUP VI.—*Leather and India-rubber Industry.*

Dickie, Joseph	Honourable mention.
Stephens, T. B.	Honourable mention.

GROUP XXVI.—*Education, Teaching, and Instruction.*

Daintree, Richard	Honourable mention.

SOUTH AUSTRALIA.

SOUTH AUSTRALIA.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Brooks, W., Woodchester	Medal for merit.
Fisher, C. B., Hill River (wheat)	Medal for merit.

GROUP IV.—*Substances of Food as Products of Industry.*

Adelaide Meat Preserving Company	Medal for merit.
Australian Vineyards Association	Medal for progress.
Davis, F. C.	Medal for merit.
Green, William	Honourable mention.
Harrison & Co. (St. Vincent)	Medal for merit.
Lorimer & Co.	Medal for merit.
Magarey & Co.	Honourable mention.

TRINIDAD.

TRINIDAD.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Needham, Sir Joseph	Honourable mention.
Trinidad Collection of Woods (S. Devenish)	Medal for merit.

VICTORIA.

VICTORIA.

GROUP I.—*Mining, Quarrying, and Metallurgy.*

Costerfield Gold and Antimony Company, 52, Elizabeth Street, Melbourne (antimony)	Medal for merit.
Mining Department, Melbourne (gold in its native state)	Medal for merit.

GROUP II.—*Agriculture, Horticulture, and Forestry.*

Burston, S., & Co., Melbourne (cereals)	Honourable mention.
Buckley, Edward, Newbridge (wheat)	Medal for merit.
Colony of Victoria, collection of woods	Medal for merit.
Currie, J. L., Lacara, Lismore (wool)	Honourable mention.
Goldsborough, R., & Co., Bourke Street West, Melbourne (wool)	Medal for merit.
Goulburn Shire Council, Goulburn (wheat)	Medal for merit.
Henderson, — Melbourne (cereals)	Medal for merit.
Horticultural Society of Victoria (fruit)	Medal for progress.
Matthews, Wm., Coghill's Creek (oats and red straw wheat)	Medal for merit.
Ormond, J., Borryavlack (wool)	Honourable mention.
Robertson, A. S., Geelong (Merino wool)	Medal for progress.
Russell, Philip, Carngham (wool)	Honourable mention.
Russell, Thomas, Wurrook, Rokewood (wool)	Honourable mention.

GROUP II.—*Agriculture, Horticulture, and Forestry*—cont.

Names.	Awards.
Russell, Thomas, & Co., Barunah Plains, Hesse (wool)	Medal for merit.

[Note.—The exhibitors are the Commissioners of International Exhibition, Melbourne, and Industrial and Technological Museum, Melbourne.]

GROUP III.—*Chemical Industry.*

Bosisto, Joseph, Richmond (chemical and pharmaceutical preparations from Australian vegetation, eucalyptus, opium, oleum, menthœ, &c.)	Medal for merit.
Hagenauer, F.A., Ramahyuck, Mission Station, Lake Wellington	Honourable mention.
Lewis and Whitty, Charles Street, Fitzroy, Melbourne (washing blue)	Honourable mention.
Lucas, Robert, Colac (crude grasstree gum)	Honourable mention.
Stewart, M., & Co., Richmond (starch)	Honourable mention.

GROUP IV.—*Substances of Food as Products of Industry.*

Acclimatisation Society of Victoria (cultivation of the vine and wine production)	Diploma of honour.
Australian Meat Preserving Company, Market Buildings, Melbourne (preserved meats)	Medal for progress.
Crippa, Fabrizzio, Hepburn (Hermitage wine)	Honourable mention.
De Castella, Hubert, Yering (Sauvignon wine)	Honourable mention.
Fallon, J. T. (Albury), Muscat wine	Medal for merit.
Grosse, Frederick, Sandhurst (wines)	Medal for merit.
Hagenaur, F. A., Lake Wellington (arrowroot)	Medal for merit.
Heine and Greiffenhagen, Strathfieldsaye, near Sandhurst (Verdeilho and Hermitage wines)	Medal for progress.
Johnston, J. S., Sunbury (Hermitage wine)	Medal for merit.
Levi, Nathaniel, 32, Collins Street West, Melbourne (Victorian beetroot sugar)	Medal for Merit.
Maplestone, Charles, Ivanhoe, Heidelberg (Hermitage wine)	Honourable mention.
Melbourne Meat Preserving Company (preserved meats)	Medal for progress.
Mount Ararat Meat Preserving Company, Ararat (ox tongues and beef)	Honourable mention.
Pohl, Carl, Strathfieldsaye, near Sandhurst (Hermitage wine)	Medal for merit.
Ramsden, Samuel, Carlton (flour)	Honourable mention.
Schmidt, Franz, Berwick (Riesling wine)	Medal for merit.
Schroeder, Ehrenfield, Chinaman's Creek, Castlemaine (Riesling wine)	Honourable mention.
Smith, George S., Wahgunyah (Muscatel and Shiraz wines)	Honourable mention.
Stewart, M., & Co., Richmond (maizena)	Medal for merit.
Vettler, John, Echuca (Grenache and Hermitage wines)	Medal for progress.
Victoria Meat Preserving Company, 118, Market Street, Melbourne (preserved meats)	Medal for merit.
Western Meat Preserving Company, Colac (preserved meats)	Medal for merit.
Zorn, Edward, Oakleigh, near Melbourne (tomato sauce)	Honourable mention.

GROUP V.—*Textile Industry and Clothing.*

Acclimatisation Society, Melbourne (ostrich plumes)	Honourable mention.

AWARDS.

Names.	Awards.
Cohn & Co., 8, Hawke Street West, Melbourne (furriers' goods)	Medal for merit.
Gray, Alexander, & Co., Albion Woollen Mills, Geelong (woollen tweeds and shawls)	Medals for merit.
Neill, Mrs. (silk cocoons)	Honourable mention.
Victorian Woollen Company, Geelong (woollen tweeds and shawls)	Honourable mention.

GROUP VI.—*Leather and India-rubber Industry.*

Michaelis, Hallenstein, & Co., 30, Lonsdale Street East, Melbourne (leather)	Honourable mention.

GROUP VIII.—*Wood Industry.*

Alcock & Co., Melbourne (manufacturers of a blackwood cabinet)	Honourable mention.

[Note.—The exhibitor is the Industrial and Technological Museum, Melbourne.]

WEST COAST OF AFRICA.

WEST COAST OF AFRICA.

Banner, S. (Ashantee implements, MS., &c., &c.)	Medal of merit.
Banner, S. (palm oil, &c. &c.)	Honourable mention.

PROFESSOR ARCHER.

RAW MATERIALS.

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REPORT on the COLLECTION of IMPORTS of RAW MATERIAL exhibited by Her Majesty's Royal Commission in the Vienna International Exhibition of 1873.—By PROFESSOR ARCHER F.R.S.E., Director of Edinburgh Museum of Science and Art, President of the Royal Scottish Society of Arts.

THE Royal Commission for the Vienna International Exhibition of 1873 having done me the honour to request me to form a collection of the raw products which constitute the foreign and colonial trade of Great Britain, as far as it was possible to show them; I proceeded to collect them at the various ports of the United Kingdom, and having collected them, arranged them in such a manner as to be of use from a Museum point of view, in teaching this branch of technical knowledge.

Having made a similar collection to illustrate the commerce of the port of Liverpool for the Exhibition of 1851 in London, I was aware of the difficulties of the undertaking and could not have carried it through, except by the kindness of numerous merchants, many of whom had helped me on the former occasion; for after the imports have passed into the manufacturer's hands they are often so altered, and their origin so lost sight of, that no reliable collection could be formed from such sources.

It was desirable that the collection should illustrate the imports of one particular year, and had it been possible, 1872 would have been chosen, but it was impossible to get the returns of the Board of Trade for that year in time to do so. The year 1871 was therefore chosen, and a collection of rather more than 1,200 specimens was formed and placed in the Department of the Vienna International Exhibition devoted to the World's Industry (Weltshandlung).

The classification adopted was the simplest possible; viz.:—

1. Food.
2. Dyeing Materials.
3. Tanning Materials.
4. Textile Fibres.
5. Vegetable and Animal Oils.
6. Gums and Gum-resins, Caoutchouc, &c.
7. Materia Medica.
8. Timber, &c.
9. Miscellaneous Vegetable substances.
10. Horns, Hoofs, Bones, Feathers, Quills, Bristles, Shells, &c.

11. Manures.
12. Mineral Substances.
13. Mineral Waters.

Many substances, and of course live animals, could not be shown, and a table will be found in the Appendix which will indicate what they were and their importance commercially.*

Of those actually exhibited in the first class, the chief in importance is—

CORN OR GRAIN.

Under this head are comprised the cereals chiefly used for food by man, viz., wheat, *Triticum vulgare*, Nees, and its varieties; barley, *Hordeum vulgare*, L.; oats, *Avena sativa*, L.; rye, *Secale cereale*, L.; maize, or Indian corn, *Zea Mays*, L.; millet of various kinds, as common millet, *Panicum miliare*, L.; Dari, or Turkish millet, *Sorghum vulgare*, Pers.; Sorghum millet, *Sorghum rubens*, W. en. These are of the utmost importance to civilised man, and are amongst the chief results of his industry, hence the trade in them is very great and widely spread. Great Britain received in 1871 from the following countries:—

	Wheat.	Barley	Oats.	Rye.	Maize.	Millet.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Russia, Northern Ports	197,568	6,717	237,572	7,314	—	—
Russia, Southern Ports	585,132	113,216	6,085	—	104,324	—
Norway	—	—	9,123	—	—	—
Denmark	6,519	53,120	23,626	—	—	—
Sweden	—	17,828	184,750	—	—	—
Germany	152,505	59,581	21,422	216	—	—
Holland	—	—	9,998	—	—	—
France	6,882	77,628	12,038	137	4,831	—
Belgium	—	9,828	16,042	—	—	—
Austria	11,957	7,619	—	—	7,802	—
Turkey	41,363	55,720	—	8,320	213,511	2,694
Wallachia and Moldavia	28,724	21,605	—	—	63,906	—
Morocco	—	—	—	—	6,158	—
Egypt	24,856	—	—	—	3,795	—
United States	669,306	3,307	—	370	365,962	—
Chili	25,350	—	—	—	—	—
British India	11,001	—	—	—	—	—
Australia	15,867	—	—	—	—	—
British North America	163,903	—	14,029	—	67,303	—
Other countries	7,555	2,227	1,023	175	3,610	10
Tons	1,948,488	428,396	535,708	16,532	841,002	2,704
	£	£	£	£	£	£
Total value	23,318,883	3,399,598	4,167,675	67,767	6,468,863	22,084

* It must be borne in mind that in the statistical tables which follow, it is not meant to be understood that the countries mentioned are those in which the materials are produced, but simply the places from which the importations have been received. Commercial operations are continually distributing produce and removing it from one market to another, according to the demands of trade.

To these quantities must be added the Flour and Meal of these grains.

	Wheaten Flour.	Barley. Meal.	Oatmeal.	Rye Meal.	Maize Meal.
	Tons. 198,897	Tons. 30	Tons. 167	Tons. 51	Tons. 485
Value -	£3,498,008	£450	£2,843	£566	£13,944

The following specimens are in the collection, viz. :—

Wheat.

American, white.
„ spring.
„ winter.
Californian.
Chili.
French.
Spanish.
Ghika (from Galatz).
Kurachi.
Rostock (new).
„ (old red).
Stettin.
Konigsburg.
Bornholm.
Wismar.
Danish.

Barley.

Danubian.
French.
Rostock.

Oats.

Danish.
Riga.
Dantzic.
Prussian.
Prince Edward's Island.

Rye.

Riga.
Dantzic.
Danish.

Maize.

American, white.
„ yellow.
„ mixed.
Italian.
Danubian.
Galatz.
Egyptian.

And samples of twelve varieties of flour and meal.

Another cereal, which for some special reason connected with the arrangement of the tariff is not classed with the above, is

RICE.

The grain yielded by the grass *Oryza sativa*, originally a native of India, its cultivation has spread to most tropical and sub-tropical countries, and even to the south of Europe. In the husk it is called by its East Indian name, Paddi, the name of "Rice" being applied to the grain when removed from the husk. It is not only greatly used

as food, and consequently largely imported into Great Britain for that purpose, but of late years much has been used by the distillers as a source of alcohol. The imports in 1871 were from—

	Rice.	Paddi.
	Tons.	Bushels.
British India:—		
Madras	10,089	42,048
Bengal and Burmah	184,506	474,584
Bombay and Scinde	20,709	—
Straits Settlements	2,483	—
Cochin China, &c.	4,215	—
South Africa	2,673	—
Holland	2,277	—
Other countries	1,869	10,608
Total	228,821	527,240
Value	£2,337,368	£100,758

The varieties of rice shown are as follows:—

Rangoon, rough.	Necranzii, rough.
„ cleaned.	„ cleaned.
Bengal, rough.	Bassein, rough.
„ cleaned.	„ cleaned.
Ballam, rough.	Java „
„ cleaned.	Moulmein „

The various kinds of legumes, the dried seeds of which are largely imported under the general name of

PULSE.

Under this head are comprised—Peas, *Pisum sativum*, L.; beans, *Faba vulgaris*, Moen; haricots, *Phaseolus* (several species); chick-peas, *Cicer arietinum*, L.; lentils, *Ervum lens*, L.; tares, *Vicia sativa*, L. These are much used as food for man and the domestic animals; in the Customs returns they are all classed under the two heads of peas and beans, hence the quantities of each cannot be given. The following is the official return for the year 1871:—

	Peas.	Pea Meal.	Beans.	Bean Meal.
	Tons.	Tons.	Tons.	Tons.
Sweden	1,164	—	1,733	—
Denmark	2,157	—	—	—
Germany	27,044	—	13,121	—
Holland	344	—	—	—
France	549	—	5,379	—
Italy	—	—	11,362	
Turkey	—	—	1,848	—
Egypt	—	—	106,137	—
Algeria			1,238	

Pulse—continued.

—	Peas.	Pea Meal.	Beans.	Bean Meal.
	Tons.	Tons.	Tons.	Tons.
Morocco - -	—	—	5,905	—
United States -	2,754	—	—	—
British North America.	15,500	—	—	—
Other countries -	1,030	—	2,815	—
Tons - -	50,542	Only in all 1	149,538	Only in all 38
Value -	£443,442	£12	£1,275,461	£160

The varieties exhibited are—

Beans, Egyptian.
„ Mazagan.
„ French.
Peas, Mazagan.
„ Canadian.
Peas, Dantzic.
Lentils, Egyptian.
Chick peas, Spanish.
Tares, Baltic Provinces.

Some substances which have undergone processes of manufacture are notwithstanding invariably classed under the head of raw produce. Such, for instance, as the products of distillation and fermentation, and more especially that most important article of food

SUGAR.

The sweet principle which exists in many plants, and in combination with water forms their juice. When expressed or otherwise obtained from the plants, it is heated up to 176° Fahr., and as the scum arises it is removed from the surface and thus the juice is clarified; a small quantity of lime is added to neutralize an acid which is present. After this the clear sweet liquid is concentrated in heated evaporating pans, and by boiling in vacuum pans. After these various processes it crystallises and cools, forming the raw sugar of commerce, which is a mixture of crystalline sugar and molasses, or uncrystallisable sugar. These are separated by various processes, originally by mere drainage, and the solid and liquid products are known as raw sugar, and molasses or treacle.

At the commencement of the present century no sugar was used in Europe but that made from the sugar cane, *Saccharum officinarum*; but during the first ten years of the century an European plant, the beet-root, *Beta vulgaris*, became a very important source of sugar; and since then what is called date sugar has been an article of extensive import from the East Indies. It is produced by the palm known as *Arenga saccharifera*. Besides these, sugar made from a species of millet from China, *Holcus saccharatus*, has become to a small extent a commercial article, and so has sugar made from the starch of the potatoe. Sugar made from the sugar maple, *Acer saccharinum*, is imported occasionally

as a sweetmeat from Canada. The imports of raw sugar for 1871 are as follows:—

	Cwts.
Germany	1,035,914
Holland	55,181
Belgium	784,712
France	1,207,850
Egypt	63,752
Java	261,679
Philippine Islands	649,176
Spanish West Indies	1,428,218
Dutch Guiana	108,870
Central America	28,092
New Granada	14,363
Peru	87,001
Brazil	1,242,309
British South Africa	39,493
Mauritius	474,604
British India—	
Bombay and Scinde	3,679
Madras	108,425
Bengal and Burmah	112,919
Straits Settlements	74,672
British West Indies	3,496,742
British Guiana	765,552
British Honduras	32,444
Other countries	50,836
Cwts.	12,126,483
Tons	606,324
Value	£15,220,474

The varieties of sugar and molasses shown are as follows:—

1st. West Indian.

Jamaica, two sorts.
Antigua.
„ concrete lumps.
„ „ soft.
Barbadoes.
Cuba.
„ Muscovado.
Cuba molasses, centrifugal.
„ „ clayed.
Havanna, clayed.
„ molasses or syrups.
Porto Rico.
West Indian concrete (Fryer's process).

2nd. South America.

Demerara.
„ syrups.
„ grainy.
Pernambuco, Fair Channel.
„ brown.
Ceara.
Maceio.
Paraiba.
Maranham.
Bahia, fair.
„ Nazaretta.
Peruvian, grainy.
„ Muscovado.
„ syrups.
„ concrete.

3rd. UNITED STATES OF AMERICA.

Treacle, thick.	Treacle, thin.
„ medium.	

4th. EAST INDIAN.

Madras, grainy jaggery.	Manila.
„ jaggery.	Mauritius, crystallised.
„ native.	„ syrups.
Bengal, date.	

5th. AFRICAN.

Egyptian, crystallised.	Egyptian, lumps.
„ syrups.	

HONEY

must be classed with sugar, of which it is a variety.

The importation of honey, especially from Chili, has increased immensely, and is supposed to be used fraudulently in brewing, but no returns of it are given by the Board of Trade. Several varieties are in the collection.

Next in importance to sugar itself are those fruits which contain it, and by their consumption furnish this very necessary element of alimentation. They are very numerous and come to us from all countries within the temperate and sub-tropical parts of the world, either in the fresh or dried state. Nuts also, which are chiefly of importance as food in consequence of the oil they contain, are classed under the same denomination.

FRUIT.

The trade in fruits of all kinds, owing to the great development of steam navigation, has become enormous; no part of the world is now too distant for the transmission of its fruits, either dried, preserved or fresh, and during last year ripe fresh pears have been sent to London from California. The Government returns do not specify each kind, but classify the whole under the following heads :—1st, almonds; 2nd, nuts of all kinds; 3rd, oranges and lemons; 4th, fruit preserved without sugar; 5th, fruit preserved in sugar; 6th, raw or fresh fruit; 7th, dried fruits (including 1st, currants; 2nd, figs; 3rd, plums; 4th, prunes; 5th, raisins); 8th, dried fruits of kinds not specified. The following table will show the extent of the importations :—

—	Almonds.	Nuts.	Oranges and Lemons.	Fruit preserved.	Fruit preserved with Sugar.	Raw Fruit.	Currants.	Figs.	Dried Plums.	Prunes.	Raisins.	Other Dried Fruits.
	Tons.	Value. £	Bushels.	Tons.	Tons.	Bushels.	Tons.	Tons.	Tons.	Tons.	Tons.	Bushels.
France	221	101,418	—	47	208	354,606	—	—	726	1,005	—	6,482
Portugal	258	—	300,508	121	27	73,87	—	533	27	—	—	—
Azores	—	—	897,773	—	—		—	—	—	—	—	—
Spain and Canaries	916	159,826	851,257	185	—	59,712	—	224	—	—	14,033	—
Italy	397	21,377	315,016	353	—	—	—	—	—	—	247	—
Austria	89	—	—	—	—	—	489	—	—	—	500	—
Malta	—	—	6,659	—	—	—	—	—	—	—	—	1,872
Greece	—	—	—	213	—	—	52,004	—	—	—	—	—
Turkey	—	—	—	71	—	—	—	3,688	—	—	5,956	40,240
Morocco	1,697	—	—	—	—	—	—	—	—	—	—	—
Gibraltar	13	—	—	—	—	—	—	—	—	—	—	5,473
Germany	—	—	—	—	236	69,519	—	—	—	—	—	—
Holland	—	—	—	—	388	160,392	—	—	—	—	—	—
Belgium	—	—	—	—	17	276,286	—	—	—	—	—	—
United States	—	7,017	—	76	59	56,441	—	—	—	181	—	991
British North America	—	—	—	—	—	55,150	—	—	—	—	—	—
British West Indies	—	32,386	—	40	17	—	—	—	—	—	—	—
Brazil	—	24,861	—	—	—	—	—	—	—	—	—	—
Ecuador	—	5,748	—	—	—	—	—	—	—	—	—	—
New Grenada	—	14,635	—	—	—	—	—	—	—	—	—	—
British India	—	—	—	—	—	10,063	—	—	—	—	—	6,563
China	—	—	—	—	188	—	—	—	—	—	—	—
Channel Islands	—	—	—	—	448	—	—	—	—	—	—	—
Other countries	54	41,023	5,618	134	60	12,520	108	94	5	189	616	9,819
Total	3,645	—	2,376,831	1,240	1,648	1,128,568	52,601	4,539	758	1,375	21,352	71,440
Tota value	£ 238,073	£ 408,291	£ 1,008,954	£ 50,442	£ 123,333	£ 596,107	£ 1,472,391	£ 154,807	£ 56,625	£ 29,894	£ 707,344	£ 57,598

The fruits exhibited in the collection were as follows, the perishable ones being represented by wax models :—

1st. THE GRAPE.

Vitus vinifera, L. Fresh, and as Currants the small seedless variety of the Greek Islands, taking its name from Corinth; the following kinds of currants were shown:—Zante, Patras, Cephalonia Vostizza, Pyrgos, and Turkey. Raisins of several kinds, as the fine kind of Muscatel, carefully dried on the vines, from Malaga and Naples. The commoner kinds come from Spain, Italy, Greece, Lower Austria, and lately a few of excellent quality from the Cape of Good Hope, which ought to supply them abundantly.

The black or Smyrna raisins, an inferior kind like a large currant, and the Sultana, also from Smyrna, the produce of a white seedless grape of medium size, very rich in sugar. The quantity of fresh grapes annually imported, though a small part of the total quantity of the fruit, comprising raisins and currants, shown in the above table, which is close upon 54,000 tons, is nevertheless very considerable, and is estimated at not much less than 5,000 tons which come from Portugal, Spain, Germany, and France.

2nd. THE FIG.

Ficus carica, L. This fruit dried and packed in boxes, drums, or palmetto baskets is received chiefly from Turkey and Greece, the finest are from Turkey in Asia, being shipped very extensively during the season from Smyrna. Those from Greece are very inferior, and so also are the small parcels which come to us from Spain and Portugal. The kinds exhibited are,—The Faro, Smyrna, (Elemi, and Select), Huelva, Malaga, Syrian, and Greek, also French glacé, and crystallized.

3rd. PRUNES AND PLUMS.

These are the products of different varieties of *Prunus Domestica*, L., largely grown for the purpose in France and Germany, from which countries we chiefly receive them. The inferior kinds called *prunes* are imported in casks, whilst the choice French plums, carefully prepared, are packed in elegant paper boxes, or in glass jars. The prunes are very extensively consumed in the manufacturing districts of England after being stewed or otherwise cooked, whilst the French plums, dried, candied, and what is called crystallized, are commonly found used as a dessert fruit. The collection contained the following varieties :—The Imperial, Greengage, Mirabelle, Elva, Guimaraens, and Prune.

4th. DATES.

The fruit of the date palm, *Phœnix dactylifera, L.* In a dried state this fruit is now imported to a considerable extent from Barbary, Egypt, Smyrna, &c. The following are the kinds in the collection :—Tunis, Taffilat, Egyptian, and Bombay; the last kind is crushed into a paste.

5th. ORANGE (the sweet variety), *Citrus aurantium*. The bitter variety for marmalade, *C. vulgaris*. LEMON, *Citrus limonum*. CITRON, *Citrus medica*. LIME, *Citrus limetta*. SHADDOCK, *C. decumana*. CUMQUAT, *C. olivæformis*.

These were illustrated by wax models, except in the case of Limes, of which specimens preserved in syrup from the West Indies, and Cumquats, preserved, candied, and crystallized, under their French designation, *Chinois orange*, both preserved, green, and ripe were shewn of very fine qualities.

6th. MISCELLANEOUS FRUITS, viz.,—

Cherries (*Cerasus capronina*, Dec., *vars.*), wax models. Apricots (*Armeniaca vulgaris*, Lam.), French, preserved. Apples (*Pyrus malus*, L.), wax models, and dried Normandy Pippins. Pears (*Pyrus communis*, L.), French, preserved. Strawberries (*Fragaria vesca*, L.), French, preserved. Mangoes (*Mangifera indica*, L.), Indian, preserved. Litchi (*Nephelium litchi*, W.), dried, from China. Bananas (*Musa sapientum*, L.), wax models. Plantains (*Musa paradisiaca*, L.), wax models. Melon (*Cucumis citrullus*, var.), wax models. Cranberries, Norwegian (*Oxycoccos palustris*, Ph.). Cranberries, Newfoundland (*O. macrocarpus*, Pers.), preserved in water. Tomatoes (*Lycopersicum esculentum*, Dunal), wax models. Tamarinds (*Tamarindus indica*, L.), preserved. Capsicums (*Capsicum annuum*, *L.*, and other species), dried, preserved, and wax models, eight kinds. Cucumbers (*Cucumis sativus*, L.), preserved as pickles. Trinidad Gherkins (*Momordica echinata*, W.), preserved as pickles. Pomegranates (*Punica granatum*, L.), wax models. Olives (*Olea Europea*, L.), preserved in saltwater, French, two qualities *Arnellany* and *Verdaille*; Spanish, one variety. Papaw (*Carica papaya*, L.), West India, preserved.

7th. ARTICLES usually classed with PRESERVED FRUITS, as—

Capers, the flower-buds of *Capparis spinosa*, L. pickled in vinegar, of which there are six qualities, *Fine*, *Mi-fine*, *Capot*, *Superfine*, *Nonpareil*, and *Finest Capucine*. Angelica, the green stems of the plant known as *Angelica Archangelica*, L., candied.

8th. NUTS, and other dried fruits classed commercially under that term.

Hazel-nuts (*Corylus Avellana*, L., varieties), Black Spanish, Barcelona, Smyrna, Messina, Naples, and Filbert. Walnuts (*Juglans regia*, L.), French, Naples, Smyrna, and Valparaiso. Hickory nuts (*Carya alba*, Nutall), from North America. Peccan nuts, (*Carya olivæformis*, Nut.), North America. Brazil-nuts (*Bertholetia excelsa*, H. and B.), from Para and Maranham. Sapucaia nuts (*Lecythis ollaria*, Aub.), from Brazil. Souari nuts (*Caryocar butyrosa* Aub.), from Trinidad. Pistachio nuts (*Pistachia lentescus*, L.), from the Levant. Cashew nuts (*Anacardium occidentale*, L.), from the West Indies. Coker or cocoa-nuts (*Coccos nucifera*, L.), from the West Indies. Ground nuts (*Arachis hypogea*, *L.*), from W. Africa, United States, and West Indies; this is much cultivated in warm climates, and is used both for food and as a source of oil, for which latter purpose it is largely employed.

9th. ALMONDS.

The kernel of the fruit of the Almond tree (*Amygdalus communis*, L., and its varieties), whether in the shell or not. Although as much a nut as many others so called, the Almond is separately classified in the Official Returns. The following kinds are in the collection:—Valencia, shelled and unshelled. Jordan, shelled and unshelled. Mogadore, shelled, unshelled, and bitter. Italian, French, and Spanish.

10th. CHESTNUTS. Spanish, Italian, French, and Sicilian were the kinds shown.

Amongst the more important vegetable products in the Food Section of the Collection must be placed the feculas or starches, such as arrow-root, obtained from the underground stems of *Maranta arundinacea*, L., of which the collection contained specimens from Bermuda, Jamaica, St. Vincent, and Natal. Tous les mois, obtained from the root tubers of a

species of Canna in the West Indies. Sago procured from the pith or cellular tissue in the trunk of the large palms, belonging to the genera Sagus and Saguerus in the East Indies. Maize flour, maizena, or Oswego starch, made from Indian corn (*Zea mays*, L.). Tapioca, farinha, and cassava. The starch obtained from the large fleshy roots of Jatropha manihot, a Brazilian plant, now extensively cultivated in other tropical countries. Our supply of this valuable fecula comes entirely from Brazil. It is, however, being cultivated in the West and East Indies.

Though not absolutely essential to our preparation of food, there is another class of substances, of which a fine series was added to the collection by Messrs. Fortnum and Mason, they are agreeable additions, and are much used in flavouring, viz. :—

SPICES AND CONDIMENTS.

This class of imports comprises the following products, which are specified by name in the official returns:—Cinnamon, the bark of *Cinnamomum Zeylanicum;* ginger, the rhizomes of *Zingiber officinalis;* pepper, the fruit of *Piper nigrum* and *Piper longum;* and those which are classed as spices unenumerated :—Cassia, or cassia lignea, the bark of a variety of *Cinnamomum Zeylanicum*; cassia buds, the dried flower buds of *Cinnamomum Zeylanicum*; nutmegs, the kernels of the fruit of *Myristica moschata*; nutmegs (long), the kernels of the fruit of *Myristica Madagascariensis;* mace, the arillus which envelopes the shell of the nutmeg; cloves, the unexpanded flowers of *Caryophyllus aromaticus;* pimento, allspice, or Jamaica pepper, the dried berries of *Eugenia pimenta;* capsicums, red, or cayenne pepper, the dried and powdered fruit of *Capsicum annuum;* Nepaul pepper, the dried and powdered fruit of *Capsicum luteum;* caraway seed, the fruit of *Carum carui;* coriander seed, the fruit of *Coriandrum sativum.* The spices and condiments were presented with the other vegetable food products by Messrs. Fortnum, Mason, and Co. of Piccadilly, but as there are many of them used in medicine, duplicate specimens will be found in the collection presented by Messrs. Evans, Lescher and Evans of Bartholomew Close, London. The imports in 1871 were as follows :—

	Cinnamon.	Ginger.	Pepper.	Spices, Unenumerated.
	lbs.	lbs.	lbs.	lbs.
Egypt	18,512	392,672	122,808	—
China	75,413	—	360,379	160,189
Ceylon	1,430,518	—	—	—
British India	—	1,457,568	910,854	269,271
Straits Settlements	—	—	21,921,400	640,544
Sierra Leone	—	666,176	—	—
Eastern Africa	—	—	—	1,587,208
West Indies	—	956,704	—	3,795,314
Germany	—	—	—	285,249
Holland	—	—	—	553,010
Other countries	60,195	191,856	352,286	208,430
Total	1,584,638	3,664,976	23,667,727	7,499,215
Value	£144,146	£70,884	£527,334	£177,004

Connected with the vegetable substances used for food are the oil-cakes resulting from the expression of oil from various seeds which are of great value in rearing stock, or animals for human food; of these a good series is contributed by Messrs. J. & J. Cunningham and Co. of Edinburgh, consisting of linseed-cake, hempseed cake, rapeseed cake, cotton-seed cake, and dodder-seed cake, altogether thirty-one different qualities. The quantities imported were as follows :—

	Tons.
Russia	6,710
Sweden	1,720
Norway	3,005
Denmark	1,308
Germany	7,953
France	39,644
Italy	2,480
Egypt	2,086
United States	93,620
British North America	976
Other countries	3,302
Tons	162,804
Value	£154,778

The animal substances exhibited in the food series are not numerous, for obvious reasons; they are as follows :—

1st. EGGS.

The eggs of the domestic fowl, *Gallus domesticus*, are imported in vast numbers, chiefly for food, but many are used for obtaining albumen, which is extensively used in the arts of calico-printing and photography. The following countries supply them :—

	No.
Denmark	3,287,880
Germany	49,120,160
Holland	3,666,000
Belgium	15,025,200
France	281,530,440
Portugal, Azores, and Madeira	9,526,680
Spain	2,293,680
Channel Islands	15,104,480
Other countries	1,113,480
Total	380,668,000
Value	£1,263,612

2ND. BUTTER.

Of which we imported from—

	Tons.
Sweden	1,027
Denmark	7,043
Germany	8,704
Holland	19,531
Belgium	4,727
France	15,234
United States of America	4,189
Australia	915
British North America	4,863
Other countries	508
Total	67,741
Value	£6,939,040

3RD. FISH AND SHELL-FISH, CURED.

Consisting of Nova Scotia herrings, anchovies, sardines, Norwegian sprats, tunny, and oysters. The last from the United States of America.

4TH. ISINGLASS.

The sound or swimming bladders of various species of fish, chiefly belonging to the sturgeon family, as the *Acipenser sturio, A. huso.* Indian isinglass is from *Polynemus plebeius,* belonging to another family (*Siluridæ*), Brazilian and Guiana from other species of the same family, probably belonging to the genera *Silurus* and *Pimelodus* frequenting the great rivers of those countries. Its value as furnishing very pure gelatine is well known.

The imports in 1871 were from—

	Tons.
Russia	28
Germany	9
Egypt	4
Brazil	44
British India	26
Straits Settlements	85
British Guiana	5
Other countries	11
Total	212
Value	£72,189

The substances used in the production of diet-drinks are of great importance, and may now be mentioned. The first of these is

TEA.

The leaves of the tea plant (*Thea viridis*, L.), prepared in different ways, and at different seasons in the growth of the plant, by which the quality is much modified, now form the materials for a large commerce with India as well as China. Java, too, is a tea-producing country, and sends its supplies chiefly through Dutch commerce to European consumers. The imports to Great Britain in 1871 from all countries were as follows:—

	Tons.
Holland	462
France	82
Egypt	536
China	67,692
Japan	129
United States	49
South Africa	52
British India	6,765
Other countries	3
Tons	75,770
Value	£11,635,644

The cultivation of tea in India has been a very great success, because not only has it been easily produced in great quantity, but it has been found that it is of fine quality, and is rich in Theine, the peculiar nitrogenous principle which renders tea of such particular importance as an article of diet.

The varieties of tea in the collection are the following:—

1ST. CHINESE.

Congou.
„ Oopack.
Hyson.
„ young.
„ „ Ping Suey.
„ Twankay.
Oolong.
Souchong.
Pekoe, orange scented.
„ flowery.
Tea siftings, wiry Canton.
Tea, orange spider-leaf.
Imperial.
Gunpowder.
Caper, Canton.
„ scented Foo-Chow-Foo.
Chulan.
Moning.
Moyune.
Kaisow, finest.
„ choice Paklin.

2ND. EAST INDIAN.

Pekoe, Souchong.
Orange Pekoe.
Pekoe.
„ broken.
Pekoe fannings.
Assam, finest flowery.
„ Darjeeling.

3RD. JAPANESE.

Japan, uncoloured.

4TH. JAVA.

Flowery Pekoe.

The next in importance is

COFFEE.

The seeds of the Coffee shrub, *Coffæa arabica*, L., a native of Arabia. These seeds are each enveloped in a hard skin, and two of them are contained in a small cherry-like fruit. The cultivation of coffee has spread to all the tropical parts of the globe, and its seeds, called berries, when roasted and ground to powder, form, with water, one of the most agreeable and wholesome of the diet drinks of mankind.

The imports into Great Britain for 1871 were as follows :—

	lbs.
France	1,848,219
Egypt	1,869,881
West Coast of Africa	988,001
Philippine Islands	2,867,708
United States of America	1,352,378
Spanish West Indies	458,158
Hayti and St. Domingo	3,448,618
Central America	19,544,519
New Granada	2,660,443
Brazil	23,066,344
British South Africa	527,041
Mauritius	231,564
Aden	298,992
British India	33,413,158
Straits Settlements	2,843,255
Ceylon	90,680,570
British West Indies	4,235,918
Other countries	1,658,113
Lbs.	191,992,880
Tons	85,711
Value	£5,394,511

of which the following sorts are shown :—

Jamaica, fine mountain.
„ (settler's).
St. Domingo.
Costa Rica.
Guatemala.
Rio, washed.
„ unwashed.
Bahia.
Ceara.
Santos.
Curacoa.
Savanilla.
Ceylon, native.
„ plantation.
East Indian, native.
„ plantation.
Mocha, fine long berry.
„ fine short berry.
African.

The next is

COCOA.

The seeds of the Cacao tree, *Theobroma Cacao*, a native of Brazil and other parts of South America. The fruit of the cacao is a large capsule about six inches in length, and containing a considerable number of seeds enveloped in pulp from which they have to be extracted. *This is*

sometimes done by burying them in the earth for a time, or by opening the capsules and washing the seeds free from the pulp by a plentiful supply of water.

The shell of the seed is usually removed, and the kernel, which is very oily, is ground into a paste called Cocoa, or, if sweetened with sugar, chocolate. Sometimes both forms of it are made dry and powdered. The imports for 1871 into Great Britain were as follows :—

	lbs.
Holland	150,529
France	952,112
Dutch Guiana	343,832
New Granada	586,802
Ecuador	6,048,410
Brazil	1,663,819
British West Indies	6,021,221
British Guiana	254,432
Other countries	347,145
Lbs.	17,368,301
Tons	7,754
Value	£394,632

The varieties of cocoa shown are—

Bahia, ordinary red.	Guayaquil.
„ red fermented.	Surinam.
„ black fermented.	St. Domingo.
„ clayed and fermented.	African.

Besides these there are a few substances of minor importance, the first of which is

CHICORY.

The dried and sliced roots of *Cichorium intybus*, L., a common weed in most parts of Europe, but cultivated extensively as a substitute for coffee. Our imports in 1872 amounted to 3,869 tons, of the value of 53,915*l.*, nearly all of which came from Belgium.

SALEP.

The dried root tubers of *Eulophia campestris*, Wall, *E. Vera*, Royle, *E. herbacea*, Lindl., and other species of orchideous plants formerly made into the diet drink called saloop, and sold in the streets of London, still continues to be imported, although rarely employed in that way it is supposed to be used in the manufacture of chocolate by some makers.

Another product used in the preparation of one of our favourite diet drinks and rapidly becoming a large importation is

HOPS,

which are the strobiles or fruit cones of the hop plant, *Humulus lupulus*, L., much cultivated in England, but now also largely imported from the Continent of Europe and the United States of America. Beyond

a very small demand for medicinal purposes, it is exclusively used in brewing beer. In 1871 the imports were from—

	Tons.
Germany	3,747
Holland	1,260
Belgium	3,060
France	289
United States	2,511
Other countries	66
Tons	10,933
Value	£895,895

In concluding the Food Section we must not omit to mention the numerous series of specimens of

TOBACCO.

The tobacco of commerce is furnished by different species of the genus *Nicotiana*. The American kinds from Virginia, Maryland, and Kentucky are yielded by *N. tabacum;* Orinoko by *N. macrophylla;* Columbian by *N. Loxensis;* Brazilian by *N. tabacum* and *N. glauca;* Cuba, Yara, and Havana by *N. repandum;* East Indian and Manilla by *N. rustica*, var. *Asiatica;* Persian by *N. persica;* Latakia, Greek, and Turkish by *N. rustica;* Dutch and German by *N. tabacum* and *N. rustica*. Tobacco is imported either in leaf, or pressed as cavendish, negrohead, &c., powdered as snuff, or formed into cigars. The total quantity imported in 1871 was as follows :—

	Tons.
Russia	2
Germany	616
Holland	2,746
Belgium	101
France	73
Greece	316
Turkey	1,179
Egypt	39
Philippine Islands	1,080
Japan	449
China	4
Australia	11
United States	25,027
Spanish West Indies	446
New Granada	1,333
South Africa	12
Straits Settlements	88
British North America	10
Brazil	47
Other countries	424
Tons	34,003
Value	£3,324,906

The varieties shown are the following :—

Maryland.	Algerian.
Virginian.	Greek.
Kentucky.	Japan.
Cuba.	Chinese.
Dutch.	American cavendish.
German.	American cavendish, small.
Turkey.	American roll.
Latakia.	American negrohead.

Within a very few years an extensive trade has sprung up, chiefly with the Continent of Europe in various agricultural seeds, the produce of which is of primary importance in feeding our cattle, hence they properly rank amongst Food materials.

The following very complete series was contributed by "The Lawson Seed and Nursery Company : "—

Agrostis stolonifera, creeping bent grass.
Agrostis vulgaris, common bent grass.
Aira cæspitosa, tufted hair grass.
Aira flexuosa, flexuous hair grass.
Aira lutescens, yellowish hair grass.
Alopecurus pratensis, meadow fox-tail grass.
Alopecurus geniculatus, jointed fox-tail grass.
Ammophila arundinacea, reedy ammophila.
Anthoxanthum odoratum, sweet vernal grass.
Arrhenantherum avenaceum, oat-like arrhenantherum
Brachypodium sylvaticum, wood brachypodium grass
Bromus Schræderi, Schræder's brome grass.
Cynosurus cristatus, dog's-tail grass.
Dactylus glomerata, cock's-foot grass.
Elymus arenarius, sand lyme grass.
Festuca duriuscula, hardish fescue grass.
Festuca elatior, taller fescue grass.
Festuca giganteus, giant fescue grass.
Festuca heterophylla, various leaved fescue grass.
Festuca loliacea, loliaceous fescue grass.
Festuca ovina, sheep's fescue grass.
Festuca pratensis, meadow fescue grass.
Festuca rubra, red fescue grass.
Festuca sylvatica, wood fescue grass.
Festuca tenuifolia, fine-leaved fescue grass.
Lolium Italicum, Italian rye grass.
Milium effusum, common millet grass.
Phalares arundinacea, common reed.
Phleum pratense, meadow cat's-tail grass.
Poa aquatica, water meadow grass.
Poa fluitans, floating meadow grass.
Poa nemoralis, wood meadow grass.
Poa nemoralis, var. *semper virens.*
Achillea millefolium, milfoil.
Brassica napa, broad-leaved rape.
Cytissus scoparius, broom.
Cichorium intybus, chicory.
Lupinus luteus, yellow lupine.
Lotus corniculatus, bird's-foot lotus.
Lotus major, greater lotus.
Medicago lupulina, hop medick.
Medicago sativa, Lucerne.

Melilotus leucantha major, great white melilot.
Onobrychis sativa, sainfoin.
Ornithopus sativus, serradelle.
Plantago lanceolata, rib-grass.
Polygonum fagopyrum, buck-wheat.
Poterium sanguisorba, burnet.
Spergula arvensis, spurry.
Trifolium hybridum, hybrid clover.
Trifolium incaruatum, scarlet clover.
Trifolium minus, small clover.
Trifolium pratense (American), meadow clover.
Trifolium pratense (Dutch), meadow clover.
Trifolium pratense (French), meadow clover.
Trifolium pratense (German), meadow clover.
Trifolium repens, white clover.
Ulex Europœus, gorse.
Lactuca sativa, lettuce.

The second division of the collection comprises the—

DYEING MATERIALS.

These are classified in the Government returns in such a manner as to render it impossible to give the exact quantity, except in a few instances, of the numerous substances which are brought from every quarter of the globe for the dyer's use.

Those which are unenumerated are from the following countries :—

	Dyestuffs.	Dyewoods.
	Tons.	Tons.
Germany	132	691
Holland	242	—
Belgium	44	—
France	1,598	891
Portugal, Azores, and Madeira	508	—
Spain and Canary Islands	85	—
Italy	280	—
Turkey	487	—
East Coast of Africa	662	—
United States	382	733
Dutch West Indies	946	687
New Granada	1,353	1,390
Ecuador	193	—
Peru	129	—
Chili	112	—
South Africa	65	—
British India	3,890	1,972
Philippine Islands	—	827
West Coast of Africa	—	4,881
Mexico	—	5,305
Venezuela	—	943
Brazil	—	207
British West Indies	—	3,440
Other countries	722	1,430
	11,840	23,397
Value	£502,738	£157,451

The materials in the collection are as follows:—

DYESTUFFS.

Annatto and Annatto seed.—The produce of a large Brazilian tree, *Bixa Orellana*, L. The colouring matter is imported as a paste either packed in casks or boxes, in layers with leaves between them (*Flag-annatto*), or in rolled masses (*Roll-annatto*), it is obtained from the seeds by maceration when fresh gathered.

Flavine is an extract from Quercitron bark, which is mentioned amongst the enumerated dyestuffs.

Orchella weed is one or more species of lichen. Chiefly, however, *Rocella tinctoria*, Ach., found in most parts of the world, but chiefly collected in Lima in South America and Angola in Africa, from which places we receive very large quantities.

Munjeet consists of the very long roots and stalks of a species of madder, *Rubia munjista*, Roxb., which is imported in not very large quantities from India.

Persian or yellow berries. The dried fruit of *Rhamnus infectorius*, L. This shrub is abundant in some parts of the Levant, where the berries are gathered and dried; they are chiefly imported from Smyrna, and are used for dyeing a beautiful orange-yellow.

Turmeric.—The dried root-stocks or underground stems of several species of *Curcuma*, chiefly *C. longa*, L., these yield a bright orange-yellow colour, and are also a principal ingredient in the manufacture of curry powder. Turmeric is imported from India.

Saffron consists of the pistils of the common crocus, *Crocus sativa*, L. It is collected only in Spain, where it is dried with great care, and forms a very valuable article. The quantity imported is very small, and it is perhaps more used in medicine than as a tinctorial article. As a colouring material it is chiefly used by cooks and confectioners.

Alkanet, the dried root of *Anchusa tinctoria*, L., has the valuable property of giving a very beautiful deep crimson colour to oils, and is used for staining wood in imitation of rosewood, &c. It is imported from France and Germany, perhaps the greatest consumers are the hair-dressers and perfumers, whose rose-oil is simply olive-oil coloured with alkanet and scented.

The dyeing materials of which exact returns are given are

1ST. INDIGO.

Which is a peculiar extract made from the tropical plant *Indigofera tinctoria*, L., which is largely cultivated in British India and Central America, and to a smaller extent in other parts of the world. It is made by infusing large quantities of the plant in vats of cold water; the water after a time becomes yellowish, and is then drawn off into another large vat, then it is violently stirred and agitated with poles so as to mix the air with it as much as possible, the result is, that the matter which gave the yellow colour to the water is oxidised and becomes blue, it also increases in weight and sinks to the bottom as a sediment, which being carefully made into cakes and dried constitutes the costly article so extensively used by dyers. In 1871 our imports were as follows:—

From—	Tons.
Germany	20
France	120
Egypt	380

	Tons.
India, French Possessions	76
Philippine Islands	54
United States of America	30
Central America	690
New Granada	208
British Possessions in South Africa	21
British India, Bombay and Scinde	20
British India, Madras	1,474
British India, Bengal and Burmah	2,135
Other countries	82
Total	5,314
Value	£2,937,224

2ND. MADDER.

The roots of *Rubia tinctoria* are much cultivated in various parts of Europe, India, Turkey, and Greece, in consequence of its value as a dyeing material, in which it is second to no other vegetable product. It is imported ground or unground, and the ground or powdered madder is also chemically prepared and imported under the name of Garancine. Imports in 1871 from—

	MADDER.	GARANCINE.
	Tons.	Tons.
Holland	557	522
France	3,799	857
Italy	4,278	—
Austria	95	—
Turkey	3,304	—
Greece	135	—
Other countries	252	8
	12,420	1,387
Value	£643,420	£223,465

3RD. LOGWOOD.

The wood of a large leguminous tree, *Hæmatoxylon Campechianum*, growing in tropical America. It is extensively used by the dyers, yielding red, purple, and black colours. The quantity received in 1871 was as follows:—

	Tons.
France	640
United States	705
Spanish West Indies	190
Hayti and St. Domingo	2,832
Mexico	1,009
British West Indies	24,059

	Tons.
British Honduras	9,174
Other countries	728
Total	39,337
Value	£195,801

4TH. QUERCITRON BARK.

The bark of the dyer's oak of America, *Quercus tinctoria*. It is used both for tanning and dyeing leather. Its colouring principle called Flavine is also similarly used. Both are produced in the United States of America, whence we imported of the bark in 1871—

Tons, 3,291. Value, £30,444

5TH. SAFFLOWER.

The petals of the composite flower *Carthamus tinctorius*, L. They are pressed when fresh gathered into little cakes about two inches in diameter and dried. They yield beautiful orange red and orange yellow colours, the former depending upon a peculiar principle known as *Carthamine*, the latter on another called Xanthine; small quantities are grown in Egypt, but the greater portion we obtain is cultivated in India.

Our imports for 1871 were—

	Tons.
From British India	698
„ other countries	69
Total	767
Value	£138,808

6TH. GALLS OR GALL-NUTS.

Excrescences produced on various plants by the insects of the genus Cynips and perhaps others. The insect punctures the softer parts of the tree or shrub, and deposits its eggs; an excrescence is the result, often of a very large size, as in the case of the Bassorah galls, which are over an inch in diameter. The common galls are fully half an inch or more. When the egg hatches, the small lava or grub feeds upon the interior of the excrescence, and in time eats its way out. If the gall-nut of commerce, which is produced on a species of oak (*Quercus infectoria*) is gathered before the escape of the insect, it is of a dark bluish green colour, and is called *Bluegall;* afterwards it is a light buff colour, and of course perforated, in which state it is known as the *White-gall*. Two other kinds of galls are now well known in commerce, and appear in this collection; they are called from the countries whence we receive them, Chinese and Japanese galls, and are said to be produced on trees of the genus *Rhus* by the punctures of insects of the genus *Aphis;* they are not used by dyers, but to obtain *Gallic* acid, which is very abundant

in them. Many varieties of the oak gall are known in commerce, all of them being produced in the Levant. Our imports for 1871 were :—
From—

	Tons.
Turkey	129
China and Japan	430
Other countries	188
Total	747
Value	£39,717

7TH. COCHINEAL.

This beautiful colouring material consists of the dead bodies of the cochineal insect, *Coccus cacti*, dried by fire in the countries where it is collected. It is a native of Mexico, where it lives upon the large thick fleshy leaves of *Opuntia cochinilifera*, Haw. There are two commercial varieties, the *Black* and *Silver*, both yield a beautiful crimson colour, which in its dry state is the well-known carmine.

It is now reared and prepared in Madeira and the Canary Islands. Our imports in 1871 were—

Tons, 2,772 Value, £719,624

The TANNING MATERIALS form the 3rd division. The chief of them are—

1ST. OAK BARK.

The barks of the common oaks of Europe, *Quercus robur*, W.; *Quercus pendunculata*, W.; *Quercus suber*, L., are extensively used for tanning leather, being very rich in tannic acid. They are largely imported from the continent of Europe. In 1871 the imports were :—From—

	Tons.	Value. £
Holland	1,731	9,919
Belgium	94,980	26,924
Spain	11,165	5,123
Italy	16,280	8,762
Total	124,156	50,728

2ND. MIMOSA OR ACACIA BARK.

Under this name the barks of various species of Acacia are imported from Australia for tanning. In 1871 we received—

Tons, 7,759. Value, £72,166.

And besides these we have valonia, camata, and camatina, the acorns and cups of *Quercus Ægilops*; the valonia being full-grown; camata half-grown, and camatina the buds; sumach, the dried and powdered leaves of *Rhus coriaria*, from Sicily, Italy, Spain, and Austria; divi-divi, the pods of *Cæsalpinia coriaria* from South America; catechu, or terra japonica, the extract of the leaves of *Nauclea gambir*, formerly made

from the seeds of *Areca catechu;* cutch, an extract from the wood of *Acacia catechu.* The imports in 1871 were from—

—	Barks, &c. not specified.	Cutch and Catechu.	Sumach.	Valonia, Camata, and Camatina.
	Tons.	Tons.	Tons.	Tons.
Holland - -	1,731	—	—	—
Belgium - -	4,749	—	—	—
Spain - -	558	—	1,062	—
Italy - -	814	—	13,979	—
United States -	3,291	—	—	—
Australia - -	7,759	—	—	—
France - -	—	92	—	—
British India -	—	4,335	—	—
Straits Settlements	—	867	—	—
Austria - -	—	—	1,133	—
Greece - -	—	—	—	888
Turkey - -	—	—	—	26,895
Other countries -	1,877	45	307	216
Tons - -	20,779	5,339	16,481	27,999
Value -	£166,529	£111,140	£206,617	£448,458

Vegetable and Animal Textile Materials, Materials for Paper, Mat, and Basket-making, &c., form the 4th division.

The first in importance is—

COTTON.

The cotton wool of commerce is produced by various species of the genus *Gossypium,* chiefly, however, by *Gossypium herbaceum,* Linn., or *Gossypium indicum,* Lamarck, from which most of the cotton of Asia and Europe is obtained. *Gossypium arboreum,* Linn., yields a small portion of East Indian cotton. *Gossypium barbadense,* Linn., yields the cotton of the West Indies, the islands of Mauritius and Bourbon; also the fine Sea Island cotton and the other varieties produced in the United States of America. *Gossypium peruvianum,* Cav., yields much of the cotton of Brazil and Peru, but within the last few years the Sea Island variety of *Gossypium barbadense* has been introduced into South America, and is rapidly spreading.

Although the natural use of cotton is only as a hairy covering to protect the seeds, yet it has become the most important of all vegetable fibres to man, and by its cultivation, preparation, and manufacture, gives rise to a commerce of the most gigantic proportions. The importation of cotton into Great Britain chiefly takes place in the ports of Liverpool, London, and Glasgow, and amounted in 1871 to 793,812 tons, which was contributed by the different producing countries in the following proportions:—

	Cwts.
United States of America - -	9,273,910
Hayti and St. Domingo - - -	12,447
Peru - - - - - -	65,221
Chili - - - - - -	31,260
Brazil - - - - - -	769,275
New Granada - - - -	50,804
British West Indies - - -	23,492

	Cwts.
Bombay and Scinde - - -	2,851,846
Madras - - - - - -	481,264
Bengal and Burmah - - -	510,381
Egypt - - - - - -	1,572,915
Turkey - - - - - -	23,127
British South Africa - - -	20,596
Australia - - - - -	32,211
Other countries - - - -	157,489
Cwts. - - - -	15,876,238
Tons - - - -	793,812
Value - - -	£55,907,070

The following varieties of cotton are shown, and a small portion so placed on a black card that the length of the staple is easily seen.

N. AMERICA.

Upland, or bowed.	Texas.
Mobile.	Sea Island.
New Orleans.	

S. AMERICA.

Pernambuco.	La Guayra Sea Island.
Ceara.	Peruvian, native seed.
Santos.	„ American seed.
Maranham.	„ Sea Island seed.
Maceio.	

EAST INDIAN.

Hingunghat.	Bengal.
Dharwar, ginned.	Egyptian, good fair.
Broach, machine ginned.	„ grown from fine Galline seed.
„ ordinary.	Smyrna.
Dhollerah.	Fiji, from Sea Island seed.
Oomrawuttee.	Tahiti do. do.
Comptah.	
Madras.	

2ND. JUTE.

The fibrous part of the stems of two plants, natives of India, *Corchorus capsularis* and *Corchorus olitorius*. Within the present century this textile material has been introduced into Europe from India, and has become of immense importance in the manufacture of coarse cloths for sacks and bagging, and also, of late, for ornamental carpeting. It is received only from British India, and the quantity in 1871 was 172,633 tons; value 3,729,735*l*.

3RD. HEMP.

The fibres of the stem of the hemp plant (*Cannabis sativa*, L.), which is cultivated in many parts of the world, is one of the most useful fibres, especially in the manufacture of cordage and string. We receive it in three states,—rough or undressed, being merely cleaned from the other parts of the stem; dressed or combed, so as to be free of short

fibres; codilla, or tow, the broken and short fibres removed in dressing. Of these we receive in 1871 from—

	Rough.	Dressed.	Tow, or Codilla.
	Tons.	Tons.	Tons.
Russia	27,170	747	1,794
Italy	14,137	400	1,448
Germany	2,174	—	295
Austria	1,119	—	117
India	2,147	—	—
Other countries	1,135	188	41
Total	47,882	1,335	3,695

Total value, £1,729,908.

4TH. FLAX.

The fibre of the flax plant (*Linum usitatissimum*, L.) is one of the most ancient materials for weaving cloth, and still one of the most extensively used and widely cultivated. It comes to us in the following conditions:—

Rough, or undressed, that is, only cleaned from the pith and bark of the stem by heckling. Dressed, or further prepared by combing, which removes the broken and short fibres. Tow or codilla, the broken and short fibres removed by dressing. Of these we import from—

	Rough.	Dressed.	Tow, or Codilla.
	Tons.	Tons.	Tons.
Russia	71,032	316	14,816
Germany	11,145	223	828
Holland	5,859	940	2,002
Belgium	8,683	4,297	3,925
France	558	—	273
Egypt	1,113	—	—
Australia	1,853	710	337
Other countries	354	49	48
Total	100,591	6,535	22,229
Value	£4,731,954	£298,474	£744,986

Besides these the following fibres are amongst the imports, but they are generally brought in as hemp or flax, and consequently are included in the above quantities.

Manila hemp, the fibre of one of the Plantains, *Musa textilis*, Nees, chiefly from the Philippine Islands, used for rope-making. New Zealand flax, obtained from the leaves of *Phormium tenax*, Forst., a New Zealand plant. The fibre is very strong, and is used for making ropes, and coarse sacking.

COIR FIBRE.

Obtained from the husks of coker nuts (*Coccos nucifera*, L.), from India and Ceylon, used for mat making.

The textile fibres yielded by the animal kingdom are also of the first importance, we have—

1st. WOOL.

The general term wool includes the hairy covering of several species of animals, as the sheep, goat, alpaca, vicugna, llama, and camel. In the official returns those from the goat and camel are called *hair*, although they would more correctly be described as they are here placed with sheep and other wools. Woollen rags are also included, as they are now very largely imported for the purpose of being re-manufactured. The imports in 1871 were as follows:—

	Sheep's Wool.	Llama, Vicugnia, and Alpaca.	Goat's Hair or Wool.	Other Kinds, including Flocks.	Woollen Rags.
	Tons.	Tons.	Tons.	Tons.	Tons.
Russia, Northern Ports	2,928	—	—	—	—
Russia, Southern Ports	3,989	—	—	12	—
Denmark	1,025	—	—	—	912
Germany	3,630	—	—	—	5,926
Holland	1,413	—	—	—	3,593
Belgium	730	—	—	15	3,170
France	2,949	—	113	88	7,565
Portugal	1,618	—	—	—	—
Gibraltar	344	—	—	—	—
Spain	272	—	—	—	512
Italy	—	—	—	—	439
Austria	914	—	32	72	—
Turkey	7,287	—	3,521	42	—
Egypt	2,527	—	—	—	—
Egypt (produce of India)	619	—	—	—	—
Morocco	694	—	—	—	—
Peru	1,416	1,377	—	—	—
Chili	269	253	—	—	—
Uruguay	1,487	—	—	—	—
Argentine Confederation	3,658	—	—	—	—
South Africa	14,720	—	105	—	—
British India	8,104	—	—	—	—
Australia	81,567	—	—	—	—
Channel Islands	—	—	—	—	1,426
Other countries	471	1	166	69	676
Total	142,581	1,631	3,937	298	24,219
Value	£17,442,906	£483,733	£1,055,248	£27,565	£498,754

The collection of Wools was as perfect as it was possible to make it, consisting of eighty-one kinds, all contributed by the firm of Messrs. Jas. L. Bowes and Brothers, of Liverpool.

The following is the list, with the market value at the date of collection :—

Trade Name.	Whence imported.	Producing Country.	Pence, per Lb.
Port Phillip, washed	Melbourne	Australia	27
„ unwashed	„	„	15½
Adelaide	„	„	12½
Sydney	„	„	13
New Zealand	Canterbury	New Zealand	15½
Cape, washed	Cape Town	Cape of Good Hope	18
„ unwashed	„ „	„ „	10
Banda Orientale	Monte Video	Uruguay	10½
Buenos Ayres	Buenos Ayres	Argentine Republic	7½
Cordova, washed	„ „	„ „	12½
„ unwashed	„ „	„ „	9
Peru, washed	Islay	Peru	17
„ „ skin wool	„	„	15
Lima, unwashed	Callao	„	12½
„ „	„	„	8½
Rio Grande, unwashed	Rio Grande	Brazil	8½
Joria, white, washed	Bombay	East Indies	19
„ yellow „	„	„	16
„ grey „	„	„	11½
Narwhar, white, washed	„	„	13½
„ yellow „	„	„	11
Ferozepore, good yellow	„	„	16½
Candahar, white, washed	„	Afghanistan	16½
„ yellow „	„	„	13½
„ grey „	„	„	10½
Abudia, unwashed	Larache	Morocco	11
Rabat „	Rabat	„	10
Mazagan „	Mazagan	„	7¼
Mogadore, washed	Saffi	„	13½
Egyptian, white, washed	Alexandria	Egypt	19½
„ yellow „	„	„	16
„ fawn „	„	„	12½
„ white, unwashed	„	„	14½
„ yellow „	„	„	11
„ coloured „	„	„	10
Benghasi, unwashed	Alexandretta	Syria	5
Bagdad, white, washed	Bombay	Asiatic Turkey	14
„ brown „	„	„ „	12½
Mossone, white, washed	Beirout	„ „	11½
„ „ unwashed	„	„ „	7½
Bed, washed	Constantinople	European Turkey	3½
Bosnia, washed	Triesti	„ „	12½
Salonica, unwashed	Salonica	„ „	9
Smyrna, washed	Smyrna	Asia Minor	13½
„ unwashed	„	„ „	7½
Eskessai, „	Constantinople	„ „	8¾
Georgian, half-washed	„	Transcaucasia	10½
Zegai, washed	Trieste	Austrian Empire	16
Hungarian, washed	„	„ „	22
Odessa, unwashed	Odessa	Russia	10
Donskoi, washed	Taganrog	„	15

Trade Name.	Whence imported.	Producing Country.	Pence, perLb.
Donskoi, washed	St. Petersburg	Russia	13½
Calmuc „	„	„	7
Galatz, grey, washed	Galatz	Roumania	8½
Alentijo, unwashed	Lisbon	Portugal	5½
Spanish „	„	Spain and Portugal	10¼
Cape Branco, washed	„	Portugal	20
Oporto, washed	„	„	17½
French, unwashed	Marseilles	France	9½
Iceland, washed	Reikjavik	Iceland	16
Silesian „	Hamburg	Prussia	36
China „	Shanghai	China	11
Italian „	Leghorn	Italy	21
Ohio „	New York	United States America	24

Besides the wool of sheep, that of other animals is imported as follows:—

Trade Name.	Whence imported.	Producing Country.	Pence, per Lb.
Angora goat's wool, washed	Constantinople	Asia Minor	13½
„ „ unwashed	„	„ „	8½
Mohair	„	„ „	41
Alpaca (average quality)	Islay	Peru	30
Vicugna „	„	„	63
Camel hair	St. Petersburgh	Russian Tartary	7½
„	Shanghai	China	13

2ND. HAIR OF ANIMALS

Is imported for various purposes,—thus, that of oxen is used by plasterers for mixing with mortar; that of goats, under the name of mohair, for spinning and weaving fine cloths; that of horses' manes and tails for weaving into hair cloth, or curled, for stuffing cushions, &c. Other kinds are imported for various purposes, such as felting; and human hair is a large item of trade for the re-decoration of our race. The imports of hair in 1871 were as follows:—

—	Oxen.	Horse.	Goat.	Human.	Unenumerated.
	Tons.	Tons.	Tons.	Value. £	Value. £
Russia	485	77	—	20,163	—
Germany	1,151	215	—	28,417	—
Holland	672	—	—	27,468	—
Belgium	276	—	—	19,174	—
Denmark	—	11	—	2,694	—
France	1,500	23	113	24,013	—
Spain	156	—	—	—	—
Italy	—	—	—	3,729	—

	Oxen.	Horse.	Goat.	Human.	Unenumerated.
	Tons.	Tons.	Tons.	Value. £	Value. £
Argentine Confederation	25	390	—	—	—
Brazil	—	18	—	—	—
Uruguay	—	267	—	—	2,448
United States	—	—	—	—	3,729
South Africa	—	—	105	—	5,359
Austria	—	—	32	—	—
Turkey	—	—	3,519	—	—
Other countries	121	66	166	—	6,785
Tons	4,386	1,067	3,935	—	—
Total value	£188,154	£202,103	£1,055,248	£125,658	£18,321

Of late years a substitute for horse-hair to some extent has been found in the hair-like fringe of the baleen plates of whales, some of it is shewn amongst the excellent products contributed by the Dundee Whale and Seal Fishing Company.

3rd. SILKS.

The products of two species of silk-worm are imported and used in the manufacture of silken fabrics. The first, and by far the most important, is that of the common silk-worm (*Bombyx mori*); the second, the Indian Tusseh Moth (*Antheræa paphia*). The imports in 1871 were from:—

	Raw Silk.	Thrown Silk.	Waste Silk.
	lbs.	lbs.	lbs.
Russia	28,436	—	—
Germany	70,070	—	54,768
Holland	32,346	16,745	245,740
Belgium	153,484	68,024	324,016
France	689,805	78,460	852,096
Italy	45,491	9,228	242,816
Turkey	90,485	—	546,224
Egypt	9,761	—	193,088
China, *direct*	1,754,981	—	949,536
China and Japan, *viâ* Egypt	4,657,197	—	—
Japan	—	—	52,528
United States	58,326	—	44,576
British India	647,845	—	827,904
Spain	—	2,274	—
Other countries	15,108	2,655	32,816
Lbs.	8,253,335	177,386	4,366,108
Value	£8,921,589	£232,752	£624,945

This does not include silk-worm gut, of which small quantities are imported from Italy for the use of anglers. It is procured by taking

the *worms* before they begin spinning and pulling them asunder in two pieces with great care; the glutinous silk contained in the sericteria, or silk-glands, is drawn into a single thread, sometimes a yard long, but more frequently half that length, when dried it is a favourite fibre with anglers to attach their hooks to.

Messrs. Eaton and Sons contributed the following varieties of silk:—

	Value, per lb. s.	d.
China, raw, Sechuen	18	0
„ „ (re-reeled)	21	0
„ skeins	17	0
„ Taisaam	20	0
„ Tsatlee, re-reeled	27	6
„ Tsatlee	26	0
„ thrown	24	0
Canton, raw, Tsatlee, reeled	20	0
„ „ re-reeled	22	6
Tonquin	17	0
Cochin China, raw	6	0
China, cocoons	3	6
„ waste, curly	3	0
„ floss	6	0
Japan, raw, Hatzoghee	22	0
„ Bjoshia	26	0
„ Mybash	27	6
„ Namba Ashu	21	0
„ Sinchu	30	0
„ Kakaduh	26	0
„ Ida	26	0
„ Tassamah	18	0
„ Aechezan	23	0
„ Sodai	24	0
„ Mastah	20	0
„ Astin	28	0
„ Kosher	23	0
„ Nagahamma	19	0
„ Doppioni	12	0
„ waste	1	6
„ cocoons	3	0
Bengal, raw, Mamoodpore	17	6
„ Surdah	27	0
„ Runganalty	25	6
„ Hurripaul	11	0
„ waste (Chassum)	3	0
„ cocoons	2	0
Bokhara, raw	17	0
Persian „	11	0
Tusseh „	7	0
Spanish organzine	23*s.* to 25	0
„ „ (Deniers)	45	0
Italian „ „	43	0
„ „	16*s.* to 23	0
„ waste (knubs and husks)	5	0
„ cocoons	3	9
Piedmont, organzine	20*s.* to 22	0
„ „ Deniers	44	0
„ Tram „	44	0
„ „	20*s.* to 22	0

	Value per lb. s.	d.
Brutia, raw - -	- 14*s.* to 16	0
„ Deniers -	- 41*s.* „ 42	0
Fossombrone „ -	- 38*s.* „ 39	0
„ „ -	- 8*s.* „ 14	0
Continental, carded waste	- - 6	0

4TH. PAPER-MAKING MATERIALS.

Almost the only materials imported for making paper are linen and cotton rags and esparto grass (*Lygœum spartium*). Of the latter two kinds are imported, the Spanish and Southern European, and the North African which is often called Alfa. Of partially manufactured paper in the form of pulp we also receive a large quantity, about 10,000 tons, or about 95,000*l.* value, but this is not included in the collection. The imports, in 1871, were :—

	Rags.	Esparto.
	Tons.	Tons.
Russia - - - -	1,347	—
Germany - - - -	6,645	
Holland - - - -	848	—
Belgium - - - -	1,571	—
France - - - -	5,907	—
Spain - - - -	1,235	80,472
Malta - - - -	—	3,261
Tripoli and Tunis - -	—	11,569
Algeria - - - -	—	45,371
Morocco - - - -	—	1,086
Turkey - - - -	2,485	—
Egypt - - - -	3,964	867
Italy - - - -	1,283	—
Other countries - - -	1,583	1,785
Total - - - -	26,868	144,411
Value - - - -	£441,036	£1,239,181

The Fifth Division comprises—

1ST. THE VEGETABLE OILS.

a. Fixed Oils.

Besides the vast quantities of oil manufactured in Great Britain the quantity imported is enormous. The chief consumption of oils is in the manufacture of soap, in the preparation of wool and jute for spinning, for lubricating machines, and as a means of illumination; for these purposes both animal and vegetable oils are used, but chiefly the latter. The chief of the imported oils are olive oil obtained from the fruit of *Olea Europea*; palm oil from the fruit of *Elais guineensis*; cocoa-nut oil from the kernels of the cocoa-nut, *Cocos nucifera*; rape or colza oil from *Brassica napus*. This last, with many others, are imported as unenumerated oils. The following were the imports in 1871, in tuns of 252 gallons, or according to value only for the unenumerated oils, and in pounds for the volatile oils :—

——	Olive.	Palm.	Cocoa Nut.	Seed of all kinds.	Essential.	Other Kinds not specified.
	Tuns.	Tuns.	Tuns.	Tuns.	Lbs.	Value.
British India -	—	—	1,285	1,650	—	£17,072
Straits Settlements	—	—	—	—	54,236	—
Ceylon - -	—	—	7,907	—	76,913	—
Hong Kong -	—	—	—	—	—	5,350
Australia - -	—	—	1,089	—	—	—
Western Africa -	—	50,649	—	—	—	—
Tripoli and Tunis	942	—	—	—	—	—
Morocco - -	1,145	—	—	—	—	—
Greece - -	6,458	—	—	—	—	—
Turkey - -	3,156	—	—	—	2,880	—
Spain - -	887	—	—	—	—	—
Portugal & Azores	2,032	973	—	170	—	—
Italy - - -	22,675	—	—	123	129,401	18,111
France - -	361	—	—	2,226	101,037	17,707
Belgium - -	—	—	—	979	—	15,672
Holland - -	—	—	—	2,040	—	10,370
Germany - -	—	—	—	2,084	52,102	—
Russia - -	—	—	—	—	—	3,639
Norway - -	—	—	—	—	—	24,576
United States -	—	—	—	736	36,180	49,367
British North America - -	—	—	—	—	—	13,884
Brazil - -	—	367	—	—	—	—
Austria - -	330	—	—	—	—	—
Other countries -	295	385	243	336	77,652	20,180
Total - -	38,281	52,374	10,523	10,354	530,401	—
	£	£	£	£	£	£
Total value -	1,858,779	1,820,698	357,260	404,386	174,916	194,893

b. Essential Oils.

Distilled from the various parts of plants are chiefly employed in medicine and perfumery, although some, such as oil of spike, distilled from the flowers of *Lavandula spica*, and oil (or spirit) of turpentine, distilled from the resinous exudation of coniferous trees, are extensively used in the arts. Exclusive of oil of turpentine, which is placed with the resinous products, the imports of essential oils in 1871 were as follows:—

	lbs.
Germany - - - -	52,102
France - - - -	101,037
Italy - - - -	129,401
Turkey - - - -	2,880
United States - - -	36,180
Straits Settlements - - -	54,236
Ceylon - - - -	76,913
Other countries - - -	77,652
Lbs. - - - -	530,401
Value - - - -	£174,916

A list of the essential oils exhibited will be found under the Division, Materia Medica.

c. Animal Oils.

These are comprised under three denominations in the Board of Trade Returns, they are derived from various species of whales and seals, one or two quadrupeds, as the swine, giving lard oil, and the horse, mare's grease. The remainder are yielded by the cod and some other species of fish. Our imports were:—

Train oil and blubber of whales and seals, and cod oil from—

	Tuns.
Norway	379
Holland	52
Portugal	119
United States of America	1,268
Whale Fisheries, Northern	3,200
Channel Islands	271
British Possessions in South Africa	346
British India	1,294
Australia	184
British North America	11,476
Other countries	702
	19,291
Value	£636,706

Spermaceti from—

	Tuns.
United States of America	4,223
Chili	106
Australia	991
Other countries	58
	5,388
	£451,028

Animal oil from—

	Tuns.
France (neat's-foot oil, &c.)	29
United States of America (chiefly lard oil)	86
Argentine Confederation (chiefly mare's grease)	9
Other countries	6
	130
	£68,942

2ND. OIL-SEEDS AND NUTS.

With the increase of machinery and other branches of manufacture the expressing of oil from the seeds of plants has, within the last half century, grown to vast importance. Previous to that time our vegetable oils consisted chiefly of olive, linseed, rape, and palm; and few others were used except to a small extent and for very special purposes. Now, however, numerous seeds are brought in large quantities from different

parts of the world, and their expression for oil forms a very large branch of industry. Those not enumerated by name in the official returns are the following:—

Sesamum seed, called also gingelli, téel, and bennie seed, the produce of *Sesamum orientale* (*Pedaliaceæ*), imported from Western Africa, Egypt, Turkey, and India; Niger seed, the produce of *Guizotia oleifera* (*Compositæ*), a native of India; safflower seed, the produce of *Carthamus tinctorius* (*Compositæ*), from India and Egypt; mustard or Indian rape, the seeds of three species of mustard usually mixed together *Sinapis glauca, Sinapis toria,* and *Sinapis nigra* (*Cruciferæ*); poppy seed, the seed of *Papaver somniferum* (*Papaveraceæ*), from India; tallow nuts, the fruit of *Aleurites triloba* (*Euphorbiaceæ*), from India; ground nuts, the seeds of *Arachis hypogœa* (*Leguminosæ*), from Western Africa, (as an edible fruit it is sent from other countries); sunflower seeds, *Helianthus annuus* (*Compositæ*), from the Black Sea ports; and a few others which are less regular importations. Those which are enumerated are shown in the following table, which includes the quantity and value of the unenumerated ones also:—

	Cotton Seed.	Linseed.	Rape Seed.	Seeds not enumerated.	Nuts and Kernels not enumerated.
	Tons.	Quarters.	Quarters.	Quarters.	Tons.
British India	—	368,043	457,164	54,491	1,092
Western Africa	—	—	—	3,388	27,123
Australia	—	—	—	—	1,576
Egypt	157,176	8,265	942	—	—
Algeria	864	4,521	—	—	—
United States	6,660	—	—	—	—
New Granada	1,730	—	—	—	—
Russia, Northern Ports	—	473,346	9,255	8,332	—
Russia, Southern Ports	—	341,573	105,388		
Germany	—	63,288	17,632	4,935	—
Holland	—	10,521	—	—	—
France	—	—	6,027	—	—
Italy	—	4,531	—	—	—
Turkey	—	24,428	20,030	—	—
Wallachia and Moldavia	—	—	47,160	—	—
Chili	—	8,189	—	—	—
Other countries	5,733	3,442	1,854	15,718	1,335
Total	172,163	1,310,147	665,452	86,859	31,126
Value	£1,495,399	£3,687,092	£1,908,474	£234,803	£417,067

3rd. TALLOW, LARD, and STEARINE.

The fat derived chiefly from oxen and sheep is largely imported under the name of tallow, and that from swine under the name of lard. Stearine is obtained chiefly from tallow and lard, and partly from various animal and vegetable oils, especially from that of the sperm

whale, which kind is known in commerce as spermaceti. In 1871 the following quantities were imported from:—

	Tallow and Stearine.	Lard.
	Tons.	Tons.
Russia	8,432	—
Holland	229	—
Belgium	311	—
France	737	—
United States	13,012	22,127
Peru	392	—
Uruguay	6,989	—
Argentine Confederation	17,476	—
Australia	26,014	—
Germany	—	582
Italy	—	276
Austria	—	92
British North America	—	588
Other countries	961	213
Tons	74,553	23,878
Value	£3,134,531	£1,310,012

4th. WAX.

The returns under this head embrace both animal and vegetable products. Of the former there are two, the well-known bee's-wax produced in Europe by the common bee (*Apis mellifica*), and in South America and in other countries by other species of bees; secondly, the Chinese insect-wax called Pe-la, the produce of *Coccus pe-la*, of which only small quantities are imported. Vegetable wax of two kinds are regular imports, but in small quantities. The first of these is the Brazilian vegetable wax, obtained from the Carnauba palm (*Corypha cerifera*), on the leaves of which it exists as a varnish-like coating; the next is the myrtle wax from South Africa, yielded by the berries of one or more species of *Myrica*. The imports in 1871 were as follows:—

	Tons.
Germany	72
Holland	65
Portugal	182
Morocco	73
China	48
United States	121
Western Africa	65
Australia	28
British North America	35
British West Indies	57
Other countries	90
Tons	836
Value	£99,529

Of bee's-wax the following sorts are exhibited:

North American.	Japan.
Chilian.	East Indian.
West Indian.	Mogador.
African.	Australian.

None of the Chinese Pe-la was imported in 1871, but both kinds of the vegetable wax above mentioned were, and are consequently exhibited.

5TH. TURPENTINE, ROSIN, TAR, AND PITCH.

Turpentine is the exudation of coniferous trees, either produced naturally, or aided by perforations of the bark and stem. Rosin is the resin which remains after distilling the light essential oil, generally called spirit, from the turpentine. Both are very extensively used in the arts, the essential oil or spirit of turpentine being an absolute necessary in the mixing of pigments for painting, and the rosin having a great variety of uses. Tar and pitch are obtained by the destructive distillation of coniferous wood. Formerly the import of crude turpentine was enormous, but it has now diminished to about 335 tons from all exporting countries, and of this a portion consists of the medicinal turpentines of Europe used in medicine. The reason of the lessened importation is that we now receive the results of distillation in the form of spirit of turpentine and rosin. The imports in 1871 were from :—

	TURPENTINE.	ROSIN.	TAR.	PITCH.
	Tons.	Tons.	Tons.	Tons.
Russia	—	—	18,086	1,479
Sweden	—	—	1,811	—
United States	—	27,873	1,400	—
France	—	8,552	—	—
Other countries	335	423	499	106
Total	335	36,848	21,796	1,585
Value	£2,698	£330,994	£132,849	£10,211

6TH. NATURAL HYDROCARBONS.

Under this head are comprised the various kinds of asphalte, petroleum, naphtha, paraffin, &c. The application of the first of these to road-making has greatly stimulated its importation. Ozokerite, a natural paraffin, has lately been introduced, and is becoming an important article. We received in 1871 from—

	Asphalte.	Petroleum.	Naphtha.	Paraffin.	Ozokerite.
	Tons.	Tons.	Tons.	Tons.	Tons.
Germany	1,242	—	—	209	200
Holland	5,914	—	—	—	—
France	4,780	—	292	—	—
Spain	249	—	—	—	—
Turkey	233	—	—	—	—
United States	—	34,842	7,870	60	—
British North America.	—	—	166	—	—
British West Indies.	1,722	—	161	—	—
Other countries	290	10	160	7	—
Tons	14,430	34,852	8,649	276	200
Total value	£52,484	£614,017	£72,030	£16,668	£8,300

The 6th Division contains—

1st. THE GUMS.

Under this name various substances are comprised, all of which are exudations from plants. Some are mucilaginous, and others resinous; many are used in the industrial arts, and others are medicinal, and will be found in the group of *Materia medica*. Of those used in the arts, the mucilaginous, besides being employed as adhesive materials, and for stiffening cotton and other fabrics, are used by confectioners to imitate vegetable jelly, and in making lozenges, &c. The resinous ones are principally employed in the manufacture of varnishes. Though yielded by plants in temperate climates, the large quantity and fine qualities demanded by commerce are only obtainable from tropical and sub-tropical countries. One or two species are always found below ground, either having fallen from the trees and become buried in time, or have remained after the trees themselves have perished. This is the case with the Kawrie gum of Australia, whilst the varieties of gum anime probably have dropped from growing trees. As but one or two gums are mentioned by name in the Government returns, only the total of all the quantities can be given.

	Tons.
Germany	55
Holland	108
France	446
Portugal	109
Austria	256
Turkey	238
Egypt	3,903
Morocco	410
Eastern Africa	49
Philippine Islands	618
Borneo	134
Sierra Leone	256
British India	811
Straits Settlements	645

	Tons.
Australia - - - - - - -	4,289
United States - - - - - -	88
Other countries - - - - -	400
Tons - - - - - - -	12,815
Value - - - - -	£729,507

The following is a list of the gums and gum resins, exclusive of medicinal ones, in the Collection :—

Arabic, from *Acacia arabica*, and other species :—
- Turkish.
- East Indian.
- Brown Barbary.
- Australian.
- Talca.
- Gedda.

Anime, from unknown plants :—
- Zanzibar, 3 qualities.
- Madagascar, 3 qualities.

Copal, from various species of leguminous trees :—
- Benguela.
- Singapore.
- Red Angola.
- Manila.
- White Sierra Leone.

Dammar, from *Dammara orientalis*, Lam., and other species :—
- Singapore.

Kawrie from *Dammara Australis*—
- Three qualities from New Zealand.

Mastic yielded by *Pistacia lentiscus*—
- From the Levant.

Sandarach, or Juniper, from *Callitris quadrivalvis*—
- Greek islands.

Senegal, from *Acacia Verek*, and *A. Seyal.*

Tragacanth, from *Astragalus gummifer*, and other species—
- From Turkey.

2ND. CAOUTCHOUC, OR INDIA-RUBBER.

This curious substance is the indurated milky juice of several species of trees growing in tropical forests. It is obtained by making incisions through the bark, and catching the milky juice in vessels placed for the purpose, or allowing it to run down the stem and harden. In South America, especially in Brazil, it has been the custom generally to form it into bottles or other shapes by dipping lumps of clay into the freshly drawn milk, and then suspending them at some distance over a fire, made by burning the nuts of the palm tree, *Attalea excelsa*; after a succession of coatings and dryings the clay is removed by soaking and washing in water. This practice is likely, before long, to be discontinued, as it is quite useless. That which runs down the stems of the trees and is pulled off in long strips is the best and purest. The following species of trees produce the caoutchouc of commerce :—South America, *Siphonia Brasiliensis*, Willd.; *Siphonia elastica*, Persoon; *Siphonia Spruceana*, Benth.; *Siphonia discolor*, Spruce; *Siphonia rigidifolia*, Ibid.; *Siphonia lutea*, Ibid.; *Siphonia pauciflora*, Ibid.; *Siphonia apiculata*, Ibid.; *Hancornia speciosa*, Gomes; *Hevea Guyanensis*, Aubl.; *Castilloa elastica*, Carv. Asia, *Urceola elastica*, Roxb.;

Ficus elastica, Roxb. Africa, *Landolphia owariensis,* Beauv. The imports from all countries in 1871 were 8,054 tons, value 1,684,281*l.*

The following kinds were in the collection :—

African Nigger.
„ flake.
„ ball.
„ tongue.
„ „ large.
Assam.
Borneo.
Carthagena.
Ceara scrap.
East Indian.
Guayaquil.
Guayaquil, damp.
„ pressed.
„ slabs.
Honduras.
Madagascar.
Peru, fine quality.
„ negrohead.
Rio de Janeiro.
West Indian sheet.
„ scrap.

3RD. GUTTA PERCHA.

The hardened juice of a large tree (*Isonandra gutta,* Hooker) growing in the Malay Islands. This useful material was introduced to the notice of Europeans by Dr. Montgomery, and was speedily applied to numerous purposes, but its chief use at present is for coating the wires of submarine telegraph cables, for which it is specially fitted, being a perfect insulator and also flexible and easily moulded when warm. In 1872 we received from—

	Tons.
France	17
Holland	75
Egypt	39
Madagascar	24
China	53
Straits Settlements	1,061
Other countries	43
Tons	1,312
Value	£199,337

The 7th division comprises the—

DRUGS, OR MATERIA MEDICA.

These are imported from nearly every part of the world, but as they are received under the general term of "drugs unenumerated," it is impossible to give the quantities of each. The total value of the imports in 1871 was 405,096*l.* This does not include opium or Peruvian bark, which are treated separately in the tariff.

Of the former of these :—

OPIUM.

We import considerable quantities for home use and exportation It is nearly all produced either in India or Turkey, the latter being the best in quality; our imports in 1871 amounted to 591,466 pounds, of the value of 596,158*l.*

PERUVIAN BARK.

The bark of various species of *Cinchona* is one of the most valuable of all medicines, being the source whence we obtain quinine, cinchonine, &c. It is a native of the Peruvian and Bolivian Andes, but is now cultivated in India, Java, and other places. The imports in 1871 were 1,052 tons. Value, 285,976*l.*

The articles composing this division were entirely contributed by Messrs. Evans, Lescher, and Evans, of Bartholomew Close, London, and Messrs. Evans, Sons, and Co., of Liverpool, and formed one of the finest, if not the best commercial collection ever put together; any attempt to describe the specimens would far exceed the limits of this report. The following is a classified list of the various materials composing it.

1st. VEGETABLE SUBSTANCES.

a.—*Roots.*

Monkshood, *Aconitum Napellus.*
Chirayta, *Agathotes chirayta.*
Marsh Mallow, *Althæa officinalis.*
Pelitory of Spain, *Anacyclus pyrethrum.*
Sweet-flag or Calamus aromaticus, *Acorus calamus.*
Angelica, *Angelica Archangelica*, L.
Galangal, *Alpinia Galanga.*
Alkanet-root, *Anchusa italica.*
Aristolochia, *Aristolochia longa.*
Virginian snake-root, *Aristolochia serpentaria.*
Arnica, *Arnica montana.*
Deadly nightshade, *Atropa belladonna.*
Ipecacuanha, *Cephaelis Ipecacuanha.*
Pareira brarva, *Cissampelos Pareira.*
Calumba, *Cocculus palmatus.*
Colchicum, *Colchicum autumnale.*
Turmeric, *Curcuma longa.*
Scammony, *Convolvulus scammonia.*
Mezereon, *Daphne mezereum.*
Jalap, *Exogonium purga.*
Gentian, *Gentiana latea.*
Liquorice, *Glycyrrhiza glabra.*
Hellebore (Black), *Helleborus niger.*
„ (White), *Veratrum album.*
„ (Green or American), *Veratrum viride.*
Elecampane, *Inula Helenium.*
Orrice or iris, *Iris Florentina.*
Rhatany, *Krameria triandra.*
Podophyllum, *Podophyllum peltatum.*
Senega, or seneka, *Polygala senega.*
Rhubarb (East Indian, 1st and 2nd), *Rheum palmatum.*
Sarsaparilla, Mexican, *Smilax medica.*
„ Jamaica, *Smilax. sp.?*
„ Honduras, *Smilax, sp.?*
Squill, *Squilla maritima.*
Valerian, *Valeriana officinalis.*
Ginger, Jamaica and African, *Zingiber officinale.*
Sumbul (plant unknown).

Indian pink, *Spigelia Marilandica.*
Blood-root, *Sanguinaria canadensis.*
Cuscus, *Andropogon muricatus.*

b.—*Stems, or parts of Stems.*

Quassia, wood raspings, *Quassia amara.*
Sassafras „ *Sassafras officinale.*
Guaiacum raspings, *Guaiacum officinale.*

c.—*Barks.*

Cusparia, *Galipea officinalis.*
Mezereon, *Daphne mezereum.*
Simaruba, *Simaruba amara.*
Canella, *Canella alba.*
Cascarilla, *Croton eleuteria.*
Greenheart, *Nectandra Rodiæi.*
Sassafras, *Sassafras officinale.*
Quilaia, *Quilaia saponaria.*
Peruvian, red, *Cinchona rubra.*
„ yellow, *C. condaminea.*
„ Carthagena, *C. calisaya.*
Orange peel, *Citrus vulgaris.*
Pomegranate rind, *Punica granatum.*

d.—*Leaves.*

Buchu (crenulate), *Barosma crenulata.*
„ (serrulate), *Barosma serratifolia.*
Henbane, *Hyoscyamus niger.*
Deadly nightshade, *Atropa belladonna.*
Senna Tinnevelly, *Cassia officinalis.*
„ „ No. 2, *Cassia officinalis.*
Alexandrian, *Cassia officinalis.*
„ No. 2, *Cassia officinalis.*
Uva-ursi, *Arctostaphylos uva ursi.*
Lobelia, *Lobelia inflata.*
Monkshood, *Aconitum Napellus.*
Patchouli, *Pogostemon Patchouli.*
Matico, *Artanthe elongata.*

e.—*Flowers, and parts of Flowers.*

Rose-leaves, *Rosa gallica.*
Saffron, Valentia and Alicante, *Crocus sativus.*
Arnica, *Arnica montana.*
Cassia-buds, *Cinnamomum cassia.*

f.—*Fruits and Seeds.*

Grains of Paradise, *Amomum granum-paradisi.*
Cardamoms, long, *Elettaria major.*
„ Madras, *Elettaria cardamomum.*
„ common, *Elettaria cardamomum.*
Fenugreek seed, Greek and German, *Trigonella fœnum-Græcum.*
Stavesacre seed, *Delphinum staphisagria.*

Aniseed, *Pimpinella anisum.*
Colchicum seeds, *Colchicum autumnale.*
Worm seed, *Artemisia (Species).*
Cumin seed, *Cuminum cyminum.*
Quince seed, *Cydonia vulgaris.*
Calabar beans, *Physostigma venenata.*
Tonquin beans, *Dipterix odorata.*
Nux vomica, *Strychnos nux vomica.*
St. Ignatius' bean, *Ignatia amara.*
Henbane seed, *Hyoscyamus niger.*
Cassia fistula, *Cathartocarpus fistula.*
Cornum, *Conium maculatum.*
Star Anise, *Illicium anisatum.*
Bael, or Bel, *Ægle marmelos.*
Colocynth, Turkish and Spanish, *Citrullus colocynthis.*
Tamarinds, *Tamarindus indica.*
Juniper-berries, *Juniperus communis.*
Fennel, *Fœniculum dulce.*
Coriander, *Coriandrum sativum.*
Dill, *Anethum graveolens.*
Cocculus indicus, *Anamirta cocculus.*
Pimento, *Eugenia pimenta.*
Cloves, *Caryophyllus aromaticus.*
Bay-berries, *Laurus nobilis.*
Cubebs, *Piper Cubeba.*
Black pepper, *Piper nigrum.*

g.—*Cryptogamic plants.*

Ergot of rye, *Secale cornutum.*
Iceland moss, *Cetraria Islandica.*
Irish moss, *Chondrus crispus.*

h.—*Essential Oils.*

Angelica, *Angelica Archangelica.*
Sweet-flag-root, *Acorus calamus.*
Lavender, and Lavender petals, *Lavendula vera.*
Orange peel, *Citrus vulgaris.*
„ flowers (Neroli), *Citrus aurantium.*
„ leaves (Petit-grain), „ „
Cinnamon, *Cinnamomum, Zeylanicum.*
„ leaves, *Cinnamomum Zeylanicum,*
Cassia, *Cinnamomum cassia.*
Rhodium. (*Species uncertain.*)
Patchouli, *Pogostemum patchouli.*
Mint, *Mentha viridis.*
Peppermint, *Mentha piperita.*
Pennyroyal, *Mentha pulegium.*
Savin, *Juniperus sabina.*
White Majoram, *Origanum majorana.*
Geranium, East Indian, *Andropogon calamus aromaticus.*
Geranium, Turkish.
„ French.
Anise seed, *Pimpinella anisum.*
Rosemary, *Rosmarinus officinalis.*
Verbena, *Andropogon schenanthus.*

Jasmine (in Oil of Almonds), *Jasminum officinale.*
Sassafras, *Sassafras officinale.*
Cajaput, *Melaleuca cajaputi.*
Sweet Fennel, *Fœniculum dulce.*
Nutmeg, *Myristica fragrans.*
Carraway, English and foreign, *Carum carui.*
Lemon, *Citrus limonum.*
Citron, *Citrus medica.*
Mustard, *Sinapis nigra.*
Almonds, *Amygdalus communis.*
Coriander, *Coriandrum sativum.*
Thyme, *Thymus vulgaris.*
Bergamot, *Citrus Bergamica.*
Winter Green, *Chimaphila umbellata.*
Juniper, *Juniperus communis.*
Sandal, *Santalum album.*
Otto of Rose, *Rosa centifolia.*

j.—*Fixed Oils.*

Castor (several sorts), *Ricinus communis.*
Croton, *Croton tiglium.*
Bay-berries, *Laurus nobilis.*
Mace, *Myristica fragrans.*
Oil of horse chestnut, *Æsculus hippocastanum.*
Oil of elder leaves, *Sambucus nigra.*

k.—*Gums, Gum-resins, Balsams, Oleobalsams, and Turpentines.*

Arabic, *Acacia arabica.*
Senegal, *Acacia Seyal* and *A. Verek.*
Catechu, black } properly extracts, *Acacia catechu.*
„ pale }
Ammoniacum (2 sorts), *Dorema ammoniacum.*
Aloes (Socotorine), *Aloe socotrina.*
„ (Cape), *A. spicata.*
„ (Barbadoes), *A. vulgaris.*
Benzoin (Siam) } *Styrax benzoin.*
„ (Sumatra) }
Bdellium, *Amyris commiphora.*
Elemi, *Amyris elemifera.*
Dragon's blood (lump and reed).
Scammony, Aleppo.
„ „ No. 1.
„ Asia Minor.
Styrax (strained) } *Styrax officinale.*
„ (reed) }
Mastic, *Pistacia lentiscus.*
Kino, *Pterocarpus erinaceus.*
Galbanum, *Galbanum officinale.*
Myrrh (East Indian) } *Balsamodendron myrrha.*
„ (Turkish) }
Olibanum, *Boswellia thurifera.*
Opoponax, *Opoponax Chironum.*
Gamboge, *Hebradendron Gambogioides.*
Euphorbium, *Euphorbia Canarensis.*
Juniper or Sandarach, *Callitris quadrivalvis.*

Balsam of Tolu, *Myrospermum toluiferum.*
„ Peru, *Myrospermum Sp.?*
„ Canada, *Abies Canadensis.*
„ Copaiva (Para and Maranham), *Copaifera multijuga, &c.*
Camphor, *Dryobalanops camphora.*
Venice Turpentine, *Larix Europæa.*
Chian Turpentine, *Pistachia terebinthus.*

l.—*Miscellaneous Vegetable Substances.*

Opium, *Papaver somniferum.*
Manna, *Fraxinus ornus.*
Elaterium, *Ecbalium officinarum,*
Lactucarium, *Lactuca virosa.*

m.—*Miscellaneous Animal Substances.*

Musk (Chinese and Tonquin), *Moschus moschiferus.*
Civet, *Viverra civetta.*
Ambergris, *Physeter macrocephalus.*
Castor, *Castor fiber.*
Cantharides, *Cantharis vesicatoria.*
Indian Blistering Fly, *Mylabris cichorei.*
Cuttle Fish bones, *Sepia officinalis.*
Cod Liver Oil, *Morrhua vulgaris.*
Spermaceti, *Physeter macrocephalus.*

n.—*Miscellaneous. Chemical Preparations.*

Quinine, *Disulphate.*
Morphia, *Muriate.*
„ , *Acetate.*
Salicine.
Veratria.
Hydrate of Chloral.
Tartaric acid.
Litmus, &c.

DIVISION 8TH.

TIMBER AND HARD WOODS, &c.

The timber used in the construction of buildings and ships, and for general purposes, is imported in the following states:—1st, hewn, that is, the stems of trees hewn square by the axe; 2nd, sawn into planks or battens, or split into laths; 3rd, various states not enumerated in the tariff, as for instance, railway sleepers, fencing, ships' masts, mine props, &c.; 4th, staves for making casks. The quantities are returned in *loads* of 50 cubic feet in each. The furniture woods are very numerous, and the imports are variable; mahogany is the only one specified by name in the returns, the others are returned as unenumerated. All of them are weighed, and the quantity given in tons. The imports in 1871 were as follows:—

—	Hewn Fir Wood.	Hewn Oak.	Hewn Teak.	Hewn Timber of other Sorts.	Sawn or Split.	Other kinds.	Staves.	Mahogany.	Other Hard Woods.
	Loads.	Loads.	Loads.	Loads.	Loads.	Loads.	Loads.	Tons.	Tons.
Russia	187,619	2,136	—	—	479,575	36,873	—	—	2,123
Sweden	228,980	—	—	2,771	906,280	68,128	3,114	—	—
Norway	226,197	—	—	5,376	435,408	84,988	14,071	—	—
Germany	297,533	35,145	—	1,688	59,757	13,056	26,755	—	—
France	57,641	—	500	—	—	—	—	1,170	1,472
Holland	—	—	—	13,425	—	—	—	—	—
United States	109,630	735	—	7,256	37,847	4,198	6,527	678	1,836
British North America	343,271	58,770	—	60,905	692,824	17,043	27,201	—	3,302
British India	—	—	18,829	1,800	—	2,532	—	—	550
Straits Settlements	—	—	4,021	—	—	—	—	—	—
British West Indies	—	—	—	732	—	—	—	342	—
Guiana	—	—	—	1,097	—	—	—	—	—
Hayti and St. Domingo	—	—	—	—	—	—	—	1,498	1,195
Mexico	—	—	—	—	—	—	—	15,445	901
Central America	—	—	—	—	—	—	—	1,882	1,199
Honduras	—	—	—	—	—	—	—	5,809	674
Brazil	—	—	—	—	—	—	—	—	1,146
Surinam	—	—	—	—	—	—	—	—	530
Spanish West Indies	—	—	—	—	—	—	—	—	430
Italy	—	—	—	—	—	—	—	—	3,761
Turkey	—	—	—	—	—	—	—	—	3,408
Other Countries	2,700	627	3	2,933	4,172	1,071	340	3,011	1,894
Total	1,453,571	97,412	23,353	87,963	2,615,863	229,489	78,008	29,335	24,400
	£	£	£	£	£	£	£	£	£
Total value	3,561,792	509,277	276,313	323,446	6,071,252	438,592	604,645	281,893	237,126

Besides the collection of timber and hard woods, a very large and interesting collection of canes and sticks for walking sticks, umbrella handles, &c. was contributed by Messrs. Barnet, Myers, and Co., of Southwark; it comprised every kind of stick and cane imported into Great Britain, the imports of some, especially Rattan or Rotang, are very large.

9TH DIVISION.

MISCELLANEOUS VEGETABLE SUBSTANCES.

1ST. CORK OR CORK WOOD.

The outer bark of the cork oak, *Quercus suber*, L., a native of the south of Europe. After being removed from the tree it is prepared by soaking in water, pressing, and firing or slightly scorching it over a fire. These operations contract the substance of the cork and fit it for use. In 1871 we imported from,—

	Tons.
France - - - - - -	115
Portugal - - - - - -	6,567
Spain - - - - - -	548
Other countries - - - - -	26
Total -	7,256
Value	£169,864

2ND. FLOWER-ROOTS.

The trade in flower-roots for horticultural purposes is very considerable, and may be classed under two heads, namely,—the annual importation of bulbs from Holland and Belgium, which amounted in value to 50,643*l.* in 1871, and miscellaneous trees and plants from various parts of the world, which were valued at 30,715*l.*

The collection of bulbs, shown preserved, is a fair example of the varieties which are imported, and was presented for the purposes by Messrs. Menier, Nash, & Menier, Strand, London. It consists of the choicest varieties of Hyacinth, Narcisus, Tulip, Crocus, Gladiolus, Lilium, Anemone, Ranunculus, Iris, Ixia, Amaryllis Sparaxis, Tritelia, Scilla, &c.

3RD. SEEDS FOR TURNERY PURPOSES.

As vegetable ivory or corosso nuts, the hard seeds of the magnificent South American Palm, *Phytelephas macrocarpa*, of which nearly a thousand tons are now annually imported from Para and Maranham. And Coquilla nuts, the large seeds of another South American Palm, *Attalea funifera*. In the vegetable ivory nuts it is the albuminous portion of the kernel which is valued for its close resemblance to ivory. On the contrary the kernel of the Coquilla nut, which is small compared with its shell, is useless, but the thick hard brown shell is capable of being turned into a great variety of ornamental articles, and as it receives a fine polish it is much prized.

Many other articles for miscellaneous uses are in the collection, but are not of sufficient importance to be especially mentioned.

10TH DIVISION.

MISCELLANEOUS ANIMAL SUBSTANCES.

1ST. HORNS AND HOOFS.

The horns and hoofs of animals are imported for manufacturing purposes in very considerable quantities, and even portions of horns, as the tips, are received in notable quantities. Those which form the staple of this branch of trade are ox and cow horns, horn tips, and pieces of hoofs; buffalo horns and horn tips (*Bubalus buffelus*) from India; deer-horns (*Axis maculata*) from India; rhinoceros horns (*Rhinoceros unicornis*) from Ceylon. They are used for a variety of purposes, such as combmaking, for the handles of knives, umbrellas, walking sticks, &c., and the rhinoceros horn forms costly handles for parasols, riding whips, &c.

The quantities received in 1871 were,—

	Tons.
France	401
Spain	99
United States	550
Brazil	285
Uruguay	366
Argentine Confederation	281
South Africa	199
British India—	
Bombay and Scinde	741
Madras	601
Bengal Burmah	767
Straits Settlements	208
Ceylon	48
Australia	507
Other countries	577
Tons	5,700
Value	£110,466

2ND. BONES

Of various species of Mammalian animals. The best are used for making buttons, brush backs, &c., and a great variety of useful articles; the inferior for animal charcoal and manure. Of the former we imported in 1871, 7,979 tons, value, 63,150*l.*; of the latter, 92,878 tons, value, 596,266*l.* Comprised in this estimate is a considerable quantity, nearly a hundred tons of giraffe bones from the Cape of Good Hope, only the large leg bones are sent, they are valuable for their great length.

3RD. FEATHERS AND DOWN FOR BEDDING.

These are produced chiefly by domestic and game birds, and by the eider-duck, swan, &c. They are imported from—

	Tons.
Russia	249
Germany	322
Holland	15
France	149
Italy	22
Other countries	17
Total	774
Value	£76,074

4TH. FEATHERS FOR ORNAMENTAL PURPOSES.

These are produced by many species of birds, indeed there is hardly one which has any brightly coloured, or specially beautiful, plumage, which is not sought for to satisfy the demands of fashion. The trade in them is very considerable; we receive from—

	Pounds.
Belgium	8,786
France	54,899
Egypt	31,624
Morocco	6,876
United States of America	5,811
Malta	6,095
South Africa	39,382
British India	9,599
Other countries	9,330
Total	172,402
Value	£378,119

The whole of the pretty and valuable series in the collection was given by Messrs. M. C. Andradé & Co. of Wood Street, Cheapside, London.

5TH. QUILLS.

Wing feathers of birds, chiefly geese and swans, for writing and other purposes, such as toothpicks, handles for small paint brushes, &c.

The quantity imported is very considerable, chiefly from the continent of Europe and the Hudson's Bay Territory in America.

Value, about £250,000.

6TH. BRISTLES.

The long and stiff hairs produced along the ridge of the backs of swine. They are of great value for making brushes, but vary much in quality in different countries; those of Russia and Poland are most valued; those of Germany are next in esteem. The products of Holland, Belgium, and France are less valued; whilst those of Great Britain are of little use to the brushmaker. In 1871 we imported—

2,915,837 lbs. Value, 399,155*l.*

The following varieties are shown:—

Siberian, okatka.	Russian, rifling.
St. Petersburg, okatka.	French, white.
St. Petersburg, suchoya.	,, grey.
St. Petersburg, first.	American.
St. Petersburg, short first.	African.
St. Petersburg, high second.	Chinese.

7TH. TUSKS OR TEETH, WHALEBONE, AND TORTOISE SHELL.

Ivory, hippopotamus tusks, walrus tusks, and whale's teeth are all classed under one head in the Board of Trade Returns, and were imported to the following extent in 1871:—

	Tons.
Portugal and Azores	34
Malta	44
Egypt	262
West Coast of Africa	—
Portuguese Possessions	22
Other parts not designated	98
East Coast of Africa, Native States	41
British Possessions on the Gold Coast	25
British Possessions in South Africa	55
British India, Bombay and Scinde	19
Other countries	50
Total	650
Value	£341,205

Of whalebone, two kinds are shown—

The *long*, from the right whale, *Balæna mysticetus.*
The *short*, from the finner whale, *Physalis antiquorum.*

Of tortoise shell the following commercial kinds are in the collection:—
Tortoise shell and tortoise hoofs.
Turtle shell and yellow-belly turtle shell.

8TH. SHELLS OF MOLLUSCA.

Mother-of-pearl (*Meleagrina margaritifera*), from Australia (Freemantle), Panama, Manila, and Bombay.

Ear-shells (various species of *Haliotis*), from the Philippine Islands and Japan.

Cameo shells (various species of *Cassis*), from the Philippine Islands and Bermuda.

Snail shells (various species of *Trochus*); and cowries (various species of *Cyprœa*), from the East Indies and other tropical countries and islands.

9TH. CORAL AND SPONGE.

Only one specimen of the former is shown, but of the latter a nice collection was contributed by Messrs. S. and H. Harris, consisting of—

West Indian, sheep's wool honeycomb.
" velvet honeycomb.
" hard-head.
" fair glove.
West Indian, grass.
Turkey, honeycomb.
" brown.
" solid.
" flat, for stable use.

11TH DIVISION.

MANURES.

Various organic and inorganic substances have become important branches of foreign commerce during the present century as fertilisers of the land. Of these, guano is the most important, after which come the bones of mammalian animals and nitrate of soda. Our imports of manurial substances in 1871 were as follows:—

	BONES.	GUANO.	NITRATE OF SODA.	OTHER SUBSTANCES NOT SPECIFIED.
	Tons.	Tons.	Tons.	Tons.
Russia	12,898	—	—	—
Denmark	1,421	—	—	—
Germany	3,879	—	—	30,077
Holland	2,643	—	—	—
Belgium	2,078	—	—	—
France	6,896	—	—	5,544
Spain	3,956	—	—	3,427
Portugal	—	—	—	6,240
Italy	8,200	—	—	—

	Bones.	Guano.	Nitrate of Soda.	Other Substances not specified.
	Tons.	Tons.	Tons.	Tons.
Egypt	11,198	—	—	—
Turkey	4,868	—	—	—
United States	2,825	3,024	—	20,873
West India Islands	—	—	—	2,475
Brazil	4,287	—	—	—
Uruguay	13,109	—	—	—
Argentine Confederation	11,170	—	—	—
Pacific Islands	—	9,893	—	—
Peru	—	142,365	64,945	938
Bolivia	—	10,045	5,940	—
Chili	—	2,370	639	—
West Coast of Africa	—	2,445	—	—
Australia	—	3,873	—	—
Other countries	3,450	4,793	1,052	10,688
Total	92,878	178,808	72,576	80,262
Value	£596,266	£1,986,989	£1,131,700	£276,949

The varieties exhibited were as follows:—
Peruvian guano, Macaber Island, *Ammoniacal.*
„ „ Guanape Island „
Paquica „ *Ammoniacal.*
Ichaboe „ „
Algoa Bay guano, *Phosphatic.*
Curacoa „ „
Malden Island guano „
Howland Island guano „
Paquica guano „
St. Helena guano „
Bone-meal, bone-dust, and bone-ash.
Nitrate of soda and muriate of potash.
East Indian muriates, and Kainite salt, from Stassfurt.

12th Division.—Mineral Substances.

1st. ORES OF METALS AND METALS.

The imports of metallic ores and metals into Great Britain are very great, especially when her internal mineral wealth is considered; thus, in addition to 9,608 tons of ores unenumerated, of the value of 148,542*l.*, there were imported in 1871 the following:—

	Iron Ore.	Iron and Steel.	Copper Ore and Regulus.	Copper.	Lead Ore.	Lead.	Tin Ore.	Tin.	Silver Ore.	Zinc Ore.	Zinc.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Russia	3,888	—	—	—	—	—	—	—	—	—	—
Norway	—	—	4,299	—	—	—	—	—	—	844	—
Sweden	—	101,307	—	—	—	—	—	—	—	—	—
Holland	—	31,154	—	—	—	2,906	—	1,866	—	—	3,398
Belgium	—	3,472	—	—	—	—	—	—	—	—	12,161
Germany	—	—	—	—	—	—	—	—	—	—	4,792
France	—	—	832	650	964	—	—	—	—	1,058	368
Spain	302,382	—	8,590	1,367	—	49,455	—	—	—	6,086	—
Portugal	—	—	2,895	33	1,245	1,670	—	—	—	—	—
Italy	—	—	4,884	—	7,768	—	—	—	—	20,761	—
Greece	—	—	—	—	—	8,800	—	—	—	—	—
Turkey	6,097	1,613	—	295	—	—	—	—	—	—	—
Algeria	—	—	—	—	—	835	—	—	—	300	—
Tripoli and Tunis	—	—	—	—	450	—	—	—	—	—	—
British North America	—	—	3,927	—	—	—	—	—	—	—	—
United States	266	—	2,306	—	7,589	—	—	—	10,056	—	—
Mexico	—	—	—	—	—	—	—	—	242	—	—
Chili	—	—	30,081	20,760	783	335	73	209	4,080	—	—
Bolivia	—	—	4,479	—	—	—	—	—	—	—	—
Peru	—	—	—	1,073	—	—	150	284	274	—	—
New Granada	—	—	—	—	—	—	—	—	116	—	—
Argentine Confederation	—	—	—	493	—	—	—	—	85	—	—
India	—	2,031	—	—	—	—	—	—	—	—	—
Straits Settlements	—	—	—	—	—	—	—	5,457	—	—	—
Australia	—	—	6,456	7,438	1,033	—	192	—	—	—	—
South Africa	—	—	6,414	—	—	—	—	158	—	—	—
Other countries	11,401	6,835	1,262	766	1,028	907	33	610	125	369	210
Tons	324,034	146,412	76,425	32,875	20,860	64,908	448	8,584	14,978	29,418	20,929
Total value	£ 343,175	£ 1,045,618	£ 1,709,379	£ 2,212,737	£ 282,141	£ 1,393,593	£ 31,767	£ 1,088,755	£ 953,956	£ 130,681	£ 430,150

2ND. BRIMSTONE OR SULPHUR.

This natural production, after being refined either by melting or sublimation, chiefly however by the former process, is imported in considerable quantities for the manufacture of gunpowder, and for use in numerous chemical manufactures. Its most abundant source is Sicily, but we obtain it in smaller quantities from other countries. In 1871 the imports were—

46,757 tons. Value, 203,663*l.*

3RD. HONE AND OIL STONES, LITHOGRAPHIC STONES, BURR STONES, MARBLES, AND LAPIDARIES STONES.

A very complete collection of hone and oil stones was contributed by Messrs. Hazeon and Co., consisting of—

Turkish, rough blue.
" " black.
" " white.
Arkansas stone, rough.
" " slab.
" " slip.
" " pencil.
Washita stone.
" hone.
" slab.
" slip.
" pencil.
Persian stone.
Peruvian stone.
Canada whetstone.
" slab.
" slip.
German hone.
" " thin
" yellow, for mounting.
Italian water stone.
French black stone.

The lithographic stones were only from Germany.
The Burr stones from France.
Of marbles, Messrs. Burke and Co. contributed a beautiful series, viz. :—

Vert-vert, France.
Vert des Alps, do.
Vert de Corsi, Italy.
Sienna, do.
San Juan, Portugal.
Jaune Fleuri, France.
St. Anne's, Belgium.
Griotte d'Italie, France.
Rouge jaspe, do.
Griotte de Flandres, Belgium.
Rosso antico, Greece.
Breccia brune, Belgium.
Brocatelle, Spain.
Rouge royal, Belgium.
Yellow breche, Italy.
Statuary, do.
Veni, do.
Caserta, Italy.
Levant green, France.
Emperor's red, Portugal.
Rose vif, France.
Sarrancolin, do.
Napoleon, do.
Caroline, Belgium.
Bardiglio, Italy.
Dove, do.
Black and gold, do.
Black, Belgium.
Coquille, do.
Sicilian, Italy.
Blanc, do.
Aspin, France.
Griotte Fleuri, do.
Cashmere onyx, do.
Algerine onyx, do.
Brocatelle, violet, Spain.

Of lapidaries' stones, the following appear in the collection :—

Brazilian topaz and cairngorm.
„ amethyst.
„ rock crystal.
Lapis lazuli.
Malachite, Siberian.
„ African.
Bloodstone from India.
Agates, Brazilian.

To which may be added, amber, meerschaum, and coral, which are also worked by lapidaries.

4TH. MISCELLANEOUS MINERAL SUBSTANCES.

Red arsenic (realgar) from Hamburg.
Yellow arsenic (orpiment), do.
Pod verdigris, Bordeaux.
Plumbago, from Cologne.
„ „ Ceylon.
„ „ Finland.
„ „ Canada.
„ „ Nova Scotia.
„ „ California.
„ „ Mexico.
French chalk, France.
Umber, Turkey.
Oxide of manganese, Spain.
Oxide of zinc, Belgium.
„ „ Silesia.
Asbestos.
Emery stone, from Greece and Smyrna.
Corundum, East Indian.
Chromate of iron.
Borate of lime (Heyescine).
Asphalt, Syrian.
„ Ancona.
„ Val de Travers.
„ Trinidad.
Talc, East Indies.
Tincal, East Indies.
Boracic acid, Tuscany.
Vermilion, Chinese.
Tin, from the Banca Straits.
Sulphate of zinc, Hamburg.
Sienna earth.
Ultramarine, Prussia.

13TH DIVISION.

MINERAL WATERS.

Apollinaris.
Bermanstoff.
Bonnes.
Condellac.
Ems.
Enghien.
Friedrichshall.
Contreville.
Orezza.
Homburg.
Pyrmont.
St. Galmear.
Congress.
Missignoi.
Schalbach.
Schmalheim.
La Bourboule.
Carlsbad.
„ salt.
Kissingen.
Kreuznach.
„ salt.
Seltzer.
Marienbad.
Ponges.
Pulna.
Soultmatt.
Spa.
Vichy.
„ salt.
Vals.
Wildunger.

All contributed by Mr. H. C. Baildon of Edinburgh.

APPENDIX A.

Imports which for various reasons could not be included in collection.

	Numbers.	Value in £ sterling.
1. LIVE ANIMALS.		£
Oxen, cows, and calves	248,612	3,682,501
Horses	3,448	78,495
Sheep	917,076	1,789,826
Swine	85,562	290,823
Menagerie specimens	—	6,002
Leeches	—	30,000
2. MEAT OR FLESH OF ANIMALS :		
Fresh or salted, dried or preserved in tins, kinds not specified	Tons. 2,117	107,814
Beef, fresh and salted	15,104	635,353
Pork „ „	14,957	693,096
Bacon and hams	54,697	2,725,909
3. POULTRY AND GAME :		
Alive and dead	—	174,518
4. FRESH FISH (not of British taking)	10,043	182,055
5. FISH, cured or salted	20,229	529,240
6. CHEESE	60,820	3,341,496
7. ICE	95,956	83,263
8. FRESH VEGETABLES	—	83,038
9. GARDEN SEEDS	—	34,703
10. SPECIMENS illustrative of Natural History	—	26,503
11. SKINS of Animals for tanning and dressing	64,334	3,859,064
12. SKINS of Animals used as furs or rugs, including sheep and goat skins for making gloves	23,606,058	2,831,601
13. FERMENTED AND DISTILLED LIQUIDS :	Gallons.	
Alcohol of all kinds	14,449,800	2,252,148
Wine	36,449,800	14,144,198
Beer and Ale of all sorts	153,576	22,229
Vinegar	56,096	6,289
Essence of Spruce	—	10
Ether	2,001	1,874
14. PRECIOUS METALS :	Ounces.	
Gold	54,824,426	21,618,924
Silver	65,929,198	16,521,903
15. PRECIOUS STONES (unset). Of these no exact return is obtainable.		

APPENDIX B.

List of contributors to the collection of imports. These gentlemen and firms gave, free of cost, fully two-thirds of the entire collection. Their names are given as they were printed in the Official Catalogue.

SAMUELSON, E., Liverpool.—Tobaccos.
SWAN, BROTHERS, Kirkcaldy, N.B. — Baltic Flax.
MINIER, NASH AND NASH, London.—Flower Roots.
HAZEON, THOMAS, AND COMPANY, Leadenhall Street, London.—Hone and other stone for sharpening tools, &c.
BOWES, J. L., AND BROTHER, Liverpool.—Wools.
MATTHEWS, J., AND COMPANY, Liverpool.—Oils and Drysalteries.
BENCKE AND SHARMAN, Liverpool.—Fibres, various.
MCANDREWS AND COMPANY, Liverpool.—Dried fruits and nuts.
JOHNSTONE, S. P., Liverpool.—Brazilian sugar.
JINGLEHURST, R., AND COMPANY, Liverpool.—Brazilian fruits.
DARBYSHIRE, MCKINNELL, AND COMPANY, Liverpool.—Series of animal products, imported into Great Britain from the River Plate, South America.
NEILSON, H., Liverpool.—South American cotton.
HOW AND BARCLAY, Liverpool.—Cocoas.
EVANS, LESCHER, AND EVANS, 60, Bartholomew Close, London; and EVANS, SONS AND COMPANY, Liverpool.—Collection of the substances imported into Great Britain, for medicinal purposes.
PIESSE AND LUBIN, London.—Perfumes.
LEWIS AND PEAT, London.—Drugs, gums, drysalteries, and Colonial produce.
MEYERS AND DAVIS, 56, Southwark Street, London.—Canes, sticks, and rattans in the rough, for walking, and umbrella sticks, furniture, and fishing-rods.
ROSE AND WILSON, London.—Oil seeds and oils.
PRICE'S PATENT CANDLE COMPANY, London.—Ozokerit.
STEAD BROTHERS, Liverpool.—Cotton wool.
HUBBACK, J., Liverpool.—Samples of Foreign grain and breadstuffs imported into Liverpool.
BOSTOCK AND ABINGDON, 20, James Street, Liverpool.—Hops.
NEWTON, KEATES, AND COMPANY, Liverpool.—Metallic ores.
BANNER, SAMUEL, Liverpool.—Petroleum, rosin, turpentine, cotton seed oil, and olive oil.
BRANCKER, J. B., Liverpool.—Colonial sugars and coffees.
BARUCHSON, ARNOLD, AND COMPANY, London, Liverpool, and Greenock. — Beetroot sugar, imported from France, Belgium, Germany, and Austria.
TOBIN, J. A., Liverpool.—African oil seeds.
MYERS, M., London.—Ivory, tortoiseshell, shells, &c.
WIGAN AND CO., London.—Isinglass.
PATRY AND PASTEUR, London.—Indigo.
ANDRADÉ DE COSTA, AND COMPANY, 7, Cripplegate, London.—Feathers for ornament.
HEAL AND SON, London.—Bed-feathers.
GARDINER, JOSEPH, AND COMPANY, London.—Hard woods.
BURKE AND COMPANY, London.—Marbles.
JOHNSON, MATTHEY, AND COMPANY, London.—Metals.

JACKSON AND GARDINER, Exchange Buildings, Liverpool.—Large miscellaneous collection of Colonial produce; embracing gums, dye-stuffs, tanning materials, caoutchouc, drugs, &c.

FORTNUM, MASON, AND COMPANY, 182, Piccadilly, London.—Tea, coffee, foreign pickles, nuts, preserved fruits and vegetables, and various foreign products.

EATON, H. W., AND SONS, 33, Old Broad Street, London.—Silk, raw, thrown, spun, and waste, and cocoons.

GORDON, J., AND COMPANY, Liverpool.—Cotton wool.

SMITH, R. M., Leith.— Flax, tow, and other fibres; Baltic grain and pulse.

BROTCHIE, R., AND COMPANY, Leith.—Chicory.

COWAN, A., AND SONS, Pennicuick, near Edinburgh.—Paper materials.

CUNNINGHAM, J. AND J., 102, West Bow, Edinburgh.—Collection of oil cakes and manures imported into Great Britain.

LAWSON SEED NURSERY COMPANY, Edinburgh.—Collection of agricultural seeds imported into Great Britain.

HUME, JOHN, Edinburgh.—Bristles.

MCLEAN AND HOPE, Leith.—Paper materials.

DUNDEE SEAL AND WHALE FISHING COMPANY (DAVID BRUCE, manager), Dundee.—Whalebone, Narwhal horn, oils, &c.

KEILLER AND SONS, Dundee.—Orange, lemon citron peel.

GILROY, BROTHERS, Dundee.—Jute.

PATENT PLUMBAGO CRUCIBLE COMPANY, Battersea, London.—Plumbago.

BAILDON, H. C., 73, Prince's Street, Edinburgh.—Mineral waters, imported into Great Britain from the continent of Europe, with salts derived from them; two specimens of American mineral waters.

HARRIS, S. AND H., 57, Mansell Street, London.—Sponges from Turkey and the Bahamas.

EDINBURGH ROPERY COMPANY, Leith.—Hemp and other fibres.

FERGUSON, ALEXANDER, Melbourne Place, Edinburgh.—Spices.

ARCHER, JOHN KNIGHT, Liverpool. — Dye woods.

Note.—In this Report only lists of the leading articles of import have been introduced, very many of minor importance have been omitted to avoid unnecessary prolixity. Perhaps it may be thought that it might have been still further curtailed; but the writer, knowing the difficulties he had to encounter in the formation of this and similar collections, has had the future difficulties of other collectors in his mind, and hopes the details of this Report may be found of use in lessening them.

APPENDICES.

PROGRAMME OF THE IMPERIAL COMMISSION.

Programme of the Imperial Commission for the Vienna Universal Exhibition of 1873.

I. Under the august patronage of His Imperial and Royal Majesty the Emperor, an International Exhibition will be held at Vienna in the year 1873, having for its aim to represent the present state of modern civilisation and the entire sphere of national economy, and to promote its further development and progress.

This Exhibition will take place in buildings specially erected for the purpose in the Imperial Park called the Prater; it will be opened on the 1st of May 1873, and closed on the 31st of October of the same year.

II. The following is the classification adopted for the objects exhibited, separating them into 26 groups:—

Group 1. Mining, Quarrying, and Metallurgy.
Group 2. Agriculture, Horticulture, and Forestry.
Group 3. Chemical Industry.
Group 4. Articles of Food as products of Industry.
Group 5. Textile Industry and Clothing.
Group 6. Leather and India-rubber Industry.
Group 7. Metal Industry.
Group 8. Wood Industry.
Group 9. Stone, Earthenware, and Glass Industry.
Group 10. Small Ware and Fancy goods.
Group 11. Paper Industry and Stationery.
Group 12. Graphic Arts and Industrial Drawing.
Group 13. Machinery and Means of Transport.
Group 14. Philosophical Instruments, Surgical Instruments.
Group 15. Musical Instruments.
Group 16. The Art of War.

This group includes all objects and contrivances belonging to the equipment of the army and the relief of the sick and wounded.

Group 17. The Navy.

This group comprehends everything relating to navigation on the sea, on lakes and rivers, shipbuilding, the fitting out of ships, the construction of harbours and light-houses, life-boats, and salvage.

Group 18. Civil Engineering, Public Works, and Architecture.

In this group will be exhibited the plans and models of executed or projected works belonging to roads and railways, aqueducts, irrigation, drainage, reservoirs, canal and river embankments, private dwellings and cottages, and public buildings (houses of parliament, theatres, hospitals, bathing establishments, public wash-houses, &c.), and also methods of lighting, ventilating, and warming.

Group 19. The Private Dwelling House, its inner arrangement and decoration.

Group 20. The Farmhouse, its arrangements, furniture, and utensils.

In these two groups it is expected that the different nations will exhibit their peculiar forms and actual conditions of domestic life.

Group 21. National Domestic Industry.

This group is intended to make known the variety and abundance of valuable designs and forms which the productions of national domestic industry, such as ornaments, potteries, textures, &c., contain.

Group 22. Representation of the Influence of Museums of Fine Arts applied to Industry.

The object of this department is to show the means by aid of which the modern museums of fine arts applied to industry (viz.: the South Kensington Museum in London, and the similar museums in Vienna, Berlin, Moscow, &c.) endeavour to improve the public taste and diffuse artistic education.

Group 23. Art applied to Religion.

This group will contain all the products of industry and the works of fine arts which are employed in public worship.

Group 24. Objects of Fine Arts of the Past, exhibited by amateurs and owners of collections (*Exposition des Amateurs*).

This group has as its aim to enable the visitor to see an Exhibition of treasures of private collections of works of fine arts, which are usually accessible only to a limited few, thus giving students and others engaged in artistic pursuits an opportunity to gain new ideas.

Group 25. Fine Arts of the present time.

This group will contain works of fine arts produced since the International Exhibition of London in 1862.

Group 26. Education, Teaching, and Instruction.

This group will contain—

(*a.*) A representation of all objects and inventions which can assist in the education of a child and contribute to its physical, intellectual, and moral development, from its birth to its entrance to school;

(*b.*) Educational and school matters, from the elementary school upwards to the technical school and the University;

(*c.*) The entire system of instruction and culture, so far as it can be brought into view by products of literature, of the public press, societies, public libraries, graphic and statistical records.

III. There will be competitive trials of machinery, apparatus, processes and methods of work of different dates, showing their successive improvements; for example: sewing machines, weaving machines, telegraphy, photography, &c. An attempt will thus be made to give an epitome of the *history of inventions*. In addition to this, an attempt will be made to place side by side the productions of machines and handwork, and to show how in some cases machines have superseded handwork, while in others they have aided and increased its products.

IV. By exhibiting also analogous products of industry, manufactured at different epochs, with their relative prices and with samples and models, it is intended to show the growing power of different industries, their dependence on the changes in taste, and their influence upon taste, as well as their importance in national economy at different epochs, thus exhibiting the *history of industry*.

V. To show by a retrospective view the influence of science on the progress and development of manufactures there will be exhibited the gradual *conversion of waste into use*, or the increase in the employment of the former, by comparing the waste with the articles manufactured therefrom, and also the intermediate products, so far as these are the results of inventions and discoveries since the first International Exhibition of London in 1851.

VI. A further aim in this Exhibition is to give the *history of prices;* to exhibit from the chief districts of production the prices of more important articles, going as far back as possible, and placed side by side in average periods of five years, and illustrated by samples and specimens.

VII. To show the international exchange of products, *a representation of the commerce and trade of the world* will be formed. For this purpose samples and specimens of the articles of trade and commerce of all the important harbours and seaports are to be exhibited.

On each sample will be marked its origin, its destination, its price and value, the quantity of import and export, &c.; along with these will be shown statistical and graphic tables, the movement of the navigation and commerce of each seaport during the last 10 years.

VIII. The intention just expressed of aiding the study of this Exhibition by the help of statistical and graphical tables will be carried into effect in all the departments of the Exhibition, by showing the industrial progress made by each country since the first International Exhibition of London in 1851, from official records. For example: there will be exhibited tables of the increasing areas of cultivated soil, the annual quantities of agricultural products, the value

of the land, the interest on money, the traffic and capital of railways, the increase of population, &c., as they have appeared at each of the periods of subsequent International Exhibitions, viz., Paris 1855, London 1862, Paris 1867.

Thus there will be shown the productive powers of different nations in the respective departments assigned to their products in the Exhibition Building.

On the other hand all particulars of the different articles to be exhibited, such as the name of the exhibitor, the description of the objects, the price (which the exhibitor is at liberty to attach if he please), may be shown on labels attached to each article.

In the same manner all other information of public interest which the exhibitor may wish to have published, such as the history and importance of the establishment, its progressive development, its annual production, may also be written or printed and annexed to the objects exhibited; in contradistinction to former International Exhibitions which confined this information to the printed catalogue.

IX. For the purpose of rendering this Exhibition especially instructive and educational, it is intended to make comparative trials and experiments on processes new or hitherto little known. The value of objects exhibited will be submitted to practical tests. For example—experiments will be made regarding the production of wines (application of the Hydro-Extractor, heating of wines, &c.), trials with machine-tools of every description, application of the electric-light, the utilizing of aërostation (captive balloons, &c.), experiments with explosive materials, with steam-ploughs, transmission of power by wire-ropes, locomotives, engines on common roads, steam fire-engines, &c.

Lectures will be given on these subjects in a special lecture-room of the Exhibition, and international prize problems issued, as, for example, on the best implements for the cultivation of beetroots for the fabrication of sugar.

X. Arrangements will be made for a series of temporary International Exhibitions of such articles as by their nature, do not admit of an exposition of long duration. They will comprise :

Living animals (horses, cattle, sheep, pigs, dogs, cats, fowls, game, fish, &c.) ;

Poultry, venison, butchers' meat, pork, &c. ;

Dairy produce ; milk, cheese, &c. ;

Vegetable produce ; fresh fruits, fresh vegetable, flowers, plants, &c. ;

Living plants injurious to agriculture and forestry.

Dynamometric experiments will be made on the tractive force of animals. Also international races at the time of the Exhibition of thoroughbred horses will take place, and for these races prizes will be awarded.

Representations of all other kinds of sports (regattas, &c.), and also national games and plays will be arranged.

Some of these temporary exhibitions will give rise to practical experiments and practical discussions on the matters to which they refer. For example : the exhibition of dairy produce will give rise to a series of experiments on the improvements in manufacturing butter and cheese, &c.

To enable the public to appreciate alimentary substances exhibited, refreshment rooms (tasting pavilions) will be erected, where each exhibitor can sell samples of his products, even in the shape of cooked food.

XI. During the Exhibition various international congresses and conferences will be arranged for discussing important matters, to which either the Exhibition itself may give rise, or which may be specially selected as subjects of international discussion.

More especially there will be international congresses of men of science, teachers and artists, physicians, directors of museums of fine art applied to industry, teachers of drawing, architects, engineers, representatives of chambers of commerce, economists acquainted with the questions relative to banking and insurance, of agriculturists, foresters, mining engineers, &c.

Among questions subject to such discussion will be the following :

The questions of intellectual property, of the improvement of public taste, of the promotion and diffusion of arts of design, of economy of transport, of

obtaining the highest efficiency of machines, of the extension and development of forest statics, of reducing the price of food, whether by increased production, better organisation of markets, reformed cookery or new methods of preserving food; of the nourishment and early rearing of an infant, of early healthful training and gymnastics, of the exertions of our time in regard to the curing of deformed children, of the education of woman and improvement of her social condition.

XII. The division of space allotted to each foreign commission will be geographical, that is to say, according to countries, in such a manner, that the different territories of production shall appear as nearly as possible in the same order, as they are situated naturally in the direction from west to east.

XIII. With reference to such objects, which admit of a classification in several of the groups specified in Paragraph H., it is left to the option of the exhibitor to name the group in which he wishes his articles to be placed.

XIV. An International Jury will be appointed to award the prizes. Each exhibitor must declare whether he wishes or not to submit to the judgment of the Jury.

If not, the object exhibited will be ticketed "*Hors concours*" (not for competition).

The awards granted by the Jury will be as follows :—

A. For the Fine Arts the prize will be given in the form of a *Medal for Fine Arts.*

B. For the other objects exhibited the prizes will be as follows :—

(*a.*) Exhibitors in former universal exhibitions will receive for the progress they have made since the last exhibition a *Medal for Progress.*

(*b.*) Exhibitors for the first time taking part in an Universal Exhibition will receive as reward for the merit they have shown in a national economical or technical point of view the *Medal for Merit.*

(*c.*) Exhibitors whose productions fulfil all the conditions of refined taste in colour or form will have the *Medal for Taste.*

(*d.*) There will also be given *Diplomas of Merit,* similar to the Honourable Mentions of former universal exhibitions.

C. The assistants and workmen who, according to the statements made by the exhibitors, have taken a notable part in the production of a rewarded object shall have the *Medal for Co-operation.*

D. The merits of individuals or corporations who have promoted the education of the people, the development of industry or the national economy, or who have specially promoted the intellectual, moral, and material welfare of the working classes, shall be rewarded by special *Diplomas of Honour.*

XV. The detailed arrangements for the organisation of the Exhibition, the composition and operations of the Juries, the system of the Catalogues, Reports, &c., will be the object of general and special rules.

Vienna, the 16th September 1871.

The President of the Imperial Commission,
ARCHDUKE RAINER.

The Chief Manager :
BARON DE SCHWARZ-SENBORN.

CLASSIFICATION AND DIVISIONS.

GROUP 1.

MINING, QUARRYING, AND METALLURGY.

(*a.*) Mineral fuels (coals, shales, and mineral oils).
(*b.*) Mineral ores and metals.
(*c.*) Other minerals (as salt, sulphur, graphite, &c.) ; not including building materials ; *vide* Group 18.
(*d.*) Natural alloys.
(*e.*) Drawings and models of objects relating to mining, metallurgy, and mineral industry, mining, engineering, surveying, and map-making.

(*f.*) Geological works and geological maps, &c.
(*g.*) Tools and inventions for mining and metallurgy, for underground and surface work.
(*h.*) Statistics of production.

Group 2.

Agriculture, Horticulture, and Forestry.

(*a.*) Plants for food and physic (excluding fresh fruits and vegetables, which are to be the subjects of temporary exhibitions).
(*b.*) Tobacco and other narcotic plants.
(*c.*) Vegetable fibre (as cotton, flax, hemp, jute, china grass, &c.); and other plants of commerce in their raw state.
(*d.*) Cocoons of silk worms.
(*e.*) Animal products in a raw state (skins, hides, feathers, bristles, &c.).
(*f.*) Wool.
(*g.*) Products of forestry (timber, wood for cabinet work, tanning substances, resin in a raw state, dying woods, barks, charcoal tinder).
(*h.*) Peat and its products.
(*i.*) Manures.
(*k.*) Drawings and models of objects used in agriculture, horticulture, and forestry; farm maps.
(*l.*) Works of the experimental stations, woodland and forest doom books, statics of forests, &c.
(*m.*) Processes and inventions for producing, transporting, and storing the above-mentioned products.
(*n.*) Plans of gardens, drawings, and models of horticultural implements, hot-houses, conservatories, irrigation, &c.
(*o.*) New methods of horticultural cultivation.
(*p.*) Statistics of production.

(*Vide* Temporary Exhibitions, No. 4.)

Group 3.

Chemical Industry.

(*a.*) Chemical products for technical and pharmaceutical purposes (acids, salts, chemical preparations of all sorts).
(*b.*) Raw substances and products of pharmacy, mineral waters, &c.
(*c.*) Fats and their products (stearine, oil acids, glycerine, soaps, candles, tapers, &c.).
(*d.*) Products of dry distillation (as refined petroleum, slate oil, parafine, phenylic acid, benzoine, anilin, &c.).
(*e.*) Ethereal oils and perfumeries.
(*f.*) Matches, &c.
(*g.*) Dye-stuffs, mineral and organic.
(*h.*) Resins (washed, dyed, or bleached), sealing-wax, varnish, albumen, isinglass, glue, starches, dextrin, &c.).
(*i.*) Contrivances and processes used in chemical production.
(*k.*) Statistics of production.

Group 4.

Substances of Food as Products of Industry.

(*a.*) Flour and other farinaceous products, malt and its products.
(*b.*) Sugar and its products.
(*c.*) Spirits and spirituous liquors, &c.
(*d.*) Wines.
(*e.*) Ale, beer, porter, &c.
(*f.*) Vinegars.
(*g.*) Preserves and extracts (extracts of meat, portable soup, condensed milk, Erbswurst, preserved vegetables, preserved meat, &c).
(*h.*) Tobacco and similar manufactures.

(*i.*) Confectionery, ginger-bread, chocolate, coffee-substitutes, &c.
(*k.*) Processes and inventions for preparing all these articles.
(*l.*) Statistics of production.

Group 5.

Textile Industry and Clothing.

(*a.*) Washed wool and hair used for textile fabrics, carded wool and worsted, combed wool and woollen fabrics, felt carpets, blankets, hair tissues, mixed fabrics, including shawls.
(*b.*) Cotton, cotton substitutes, cotton thread, cotton fabrics and cords.
(*c.*) Flax, hemp, jute, and other fibres, yarns, threads, and fabrics of the same; straw fabrics for bonnets, screens and mats, webs and cords of reed, cane, bass, hair, wire, &c.
(*d.*) Raw silk, spun silk, and manufactures of silk, silk wastes.
(*e.*) Small ware manufactures, gold and silver cloths and embroideries.
(*f.*) Lace.
(*g.*) Hosiery, milled and unmilled.
(*h.*) Finished objects of clothing (clothes, gowns, hats, bonnets, shoes and boots, gloves, linen, &c.).
(*i.*) Upholstery, carpeting, curtains, bed-furniture, &c.
(*k.*) Artificial flowers and feather ornaments.
(*l.*) Processes and inventions used in the production of these manufactures.
(*m.*) Statistics of production.

Group 6.

Leather and India-rubber Industry.

(*a.*) Leather; articles of leather, harness, saddles, trunks, and other leather goods, excluding clothing and fancy goods: parchment and gold-beaters' skin.
(*b.*) Skins and furs.
(*c.*) India-rubber and gutta-percha articles; (excluding philosophical and mechanical instruments, and parts of machinery), waterproof stuffs and cloths.
(*d.*) Processes and inventions used in the production of these manufactures.
(*e.*) Statistics of production.

Group 7.

Metal Industry.

(*a.*) Goldsmith's and silversmith's work and jewellery, &c.
(*b.*) Iron and steel wares, excluding machinery, building materials, philosophical and musical instruments.
(*c.*) Manufactures from other metals and alloys.
(*d.*) Weapons of every description except military arms.
(*e.*) Processes and inventions used in the productions of these manufactures.
(*f.*) Statistics of production.

Group 8.

Wood Industry.

(*a.*) Cabinet work (inlaid floors, windows, doors, &c.).
(*b.*) Joiner's work.
(*c.*) Cleft woodwork (casks, shingles, sieves, &c.).
(*d.*) Small staves and their products, matches, &c.).
(*e.*) Veneers and marqueteries.
(*f.*) Cut and turned wood.
(*g.*) Chisel work and carved work.
(*h.*) Cork manufactures.
(*i.*) Basket work.
(*k.*) Woodwork painted, stained and gilt.
(*l.*) Processes and inventions used in the production of these manufactures
(*m.*) Statistics of manufactures.

Group 9.

Stone, Earthenware, and Glass Industry.

(*a.*) Stones, natural and artificial; slate and cement works (natural and imitated stones and marbles, paving stones and floor tiles, ornaments and decorations, pipes, grinding stones, &c.).
(*b.*) Earthenware (pipes, cooking vessels, stoves, plastic reproductions, terra-cottas, &c.).
(*c.*) Glass manufactures (glass for household use and fancy purposes, imitation gems and pearls unset, &c.).
(*d.*) Processes and manufactures used in the production of the above articles.
(*e.*) Statistics of production.

Group 10.

Small-ware and Fancy Goods.

(*a.*) Manufactures of ivory, meerschaum, tortoise-shell, mother-of-pearl, whalebone, wax wares, japanned goods.
(*b.*) Fancy goods of leather, bronze, &c.
(*c.*) Umbrellas, parasols, fans, canes, whips, &c.
(*d.*) Combs and brushes.
(*e.*) Toys.
(*f.*) Processes and inventions used in the production of manufactures.
(*g.*) Statistics of production.

Group 11.

Paper Industry and Stationery.

(*a.*) Paper pulp, paper, and paste-board.
(*b.*) Coloured papers, paper hangings, tapestry, playing cards, &c.
(*c.*) Papier-mâché goods, card, and millboard.
(*d.*) Articles for writing, drawing, and painting.
(*e.*) Bookbinding and similar work.
(*f.*) Processes and manufactures used in the production of the above manufactures.
(*g.*) Statistics of production.

Group 12.

Graphic Arts and Industrial Drawing.

(*a.*) Book-printing.
(*b.*) Xylography.
(*c.*) Copper-plate and steel-plate printing.
(*d.*) Lithography and chromolithography.
(*e.*) Photography.
(*f.*) Engraving and guilloche work.
(*g.*) Pattern-drawing and drawing for decoration.
(*h.*) Tools and apparatus.
(*i.*) Statistics of production.

Group 13.

Machinery and Means of Transport.

(*a.*) Prime-movers (steam-generators, steam-engines, waterwheels, turbines, pressure-engines, air, wind, and electro-magnetic engines, gas machines).
(*b.*) Machines for transmitting power (shafts, wheels, pulleys, bands, &c.).
(*c.*) Machinery for working special kinds of material (machines for mining, metallurgy, metal-work, and woodwork; machines for spinning, weaving, knitting, sewing and embroidering; machines for fulling, cleaning, shearing, dyeing; machines for bleaching, leather dressing, &c.; machines for paper manufactures and book-binding, for type founding, printing, lithography, copper-plate printing, colour-printing,

&c.; machines and apparatus for sugar-making, oil manufacture, breweries, distilleries, stearine, soap, candles, starch, ice-making, match-making, cornmills, and agricultural machinery and apparatus).

(*d.*) Other machinery not belonging to the above-mentioned (blast-engines, fire-engines, pumps, ventilators, &c.).

(*e.*) Materials and parts of machinery.

(*f.*) Railway machinery (locomotives, tenders, railway velocipedes and parts of them, railway carriages and parts composing them, special machinery and apparatus for railway workshops and railway contrivances; for making and maintaining railway plant; snow ploughs, &c.).

(*g.*) Steam gauges, dynamometers, tradiometers, &c.

(*h.*) All sorts of vehicles not connected with rail.

(*i.*) Statistics of production.

Group 14.

Philosophical, Surgical Instruments.

(*a.*) Mathematical, astronomical, physical, and chemical instruments (instruments for measuring, weighing, and dividing; for optical purposes and electric telegraphy).

(*b.*) Surgical instruments and apparatus (artificial limbs, teeth, &c.).

(*c.*) Horological instruments, clocks, watches and their parts (chronoscopes, chronographs, electric clocks).

(*d.*) Statistics of production.

Group 15.

Musical Instruments.

(*a.*) Musical instruments.

(*b.*) Parts of them (strings, bows, moulding boards, membranes, keys, pipes, &c.).

(*c.*) Sound carrying apparatus (speaking pipes, signal whistles, &c.).

(*d.*) Bells, chimes of bells.

(*e.*) Statistics of production.

(*Vide* Additional Exhibition, No. 3).

Group 16.

The Art of War.

(*a.*) Organisation and recruiting of armies.

(*b.*) Equipment of troops, accoutrements, and armour.

(*c.*) Artillery.

(*d.*) Military engineering.

(*e.*) Sanitary contrivances.

(*f.*) Military education, training, and instruction.

(*g.*) Cartography and historiography.

Group 17.

The Navy.

(*a.*) Materials for naval architecture.

(*b.*) Models and drawings of boats and ships for inland lake and river navigation; sea-going ships, coasting vessels, merchant ships and ships of war, stores and fittings for equipment, outfit and armament of ships.

(*c.*) Tools and apparatus used in ship-building.

(*d.*) Clothing, outfit, and accommodation for crews.

(*e.*) Land and water works for navigation (models and drawings of docks, harbours, sluices, floating docks, floating batteries, and coast defences.

(*f.*) Hydrography, charts, metereorological instruments; education of seamen and officers.

Group 18.

Civil Engineering, Public Works, and Architecture.

(*a.*) Building materials; processes and apparatus for quarrying, brick-making; iron girder work; preparation and preservation of wood; artificial stone, terra-cotta work, &c.

(*b.*) Materials and appliances for foundations (pile-drivers, screw-piles, coffer-dams, caissons, pneumatic and diving apparatus.

(*c.*) Contrivances and tools for earth-works (excavators, dredging-machines, apparatus for raising, carrying, and transporting earth and materials).

(*d.*) Materials and apparatus used for roads and railways (road rollers; railway superstructure, switches, crossings, turntables, traversing-tables, inclined planes, lifts; pneumatic and other modes of propelling; water stations and their apparatus, railway station buildings of all kinds, and systems of railway signals).

(*e.*) Hydraulic engineering works, excluding sea works (river works, canal works, dikes, locks, dams, &c.).

(*f.*) Models and plans of viaducts, bridges, and aqueducts, &c.

(*g.*) Plans, models and drawings of public buildings, dwelling-houses, barracks, penitentiaries, prisons and hospitals, schools and theatres, labourers' cottages; apparatus for lifting and moving heavy weights in buildings, as lifts, &c.; plans and models of cheap dwelling-houses; tools and implements of artisan builders.

(*h.*). Apparatus and inventions for health, comfort, and convenience in buildings (for lighting, water supply, drainage; waterclosets, lightning conductors, &c.).

(*i.*) Agricultural engineering; plans for culture, fencing, draining, from buildings; buildings for cattle breeding; stores, stables, manure tanks, &c.

(*k.*) Industrial buildings; spinning mills, weaving mills, grinding mills; distilleries, breweries, sugar manufactories; warehouses, saw-mills, and docks, &c.

Group 19.

The Private Dwelling-House, its Inner Arrangement and Decoration.

(*a.*) Models, drawings, and finished buildings representing dwelling-houses of civilised nations.

(*b.*) Drawings, models, and examples of thoroughly furnished apartments.

Group 20.

The Farm House, its Arrangements, Furniture, and Utensils.

(*a.*) Finished buildings, models, and drawings of farmhouses of the different nations of the world.

(*b.*) Drawings, models and examples of peasant rooms, furnished and fitted out with their furniture and apparatus.

Group 21.

National Domestic Industry.

(*a.*) Pottery and porcelain.

(*b.*) Fabrics, tapestry, embroidery, lace, and other needle-work.

(*c.*) Metal articles and ornaments.

(*d.*) Carved work and utensils.

Group 22.

Exhibition showing the Organisation and Influence of Museums of Fine Art as applied to Industry.

(*a.*) The various methods and means by which the different modern museums (viz., the South Kensington Museum in London, and the

similar museums in Vienna, Berlin, Moscow, &c.) endeavour to carry out the improvement of the general taste of the people and the manner in which they promote the art industry and public instruction of their countries.

(*b.*) Exhibition of objects which have been produced and propagated by those modern museums.

Group 23.

Art applied to Religion.

(*a.*) Decoration of churches (wall decoration, stained glass, glass-painting, &c.).

(*b.*) Church furniture (altars, organs, pulpits, pews, shrines for enclosing sacred vessels, &c.).

(*c.*) Ornaments for altars, pulpits, crucifixes, chalices, liburiums, candlesticks, altar hangings and carpets, pulpit hangings, &c.

(*d.*) Objects used in baptism and funerals, &c.

Group 24.

Objects of Fine Arts of the Past, exhibited by Amateurs and Owners of Collections (Exposition des Amateurs).

(*a.*) Paintings of ancient masters.

(*b.*) Objets d'art. Bronzes, enamels, miniatures, majolicas, porcelain, faience, &c.

Group 25.

Fine Arts of the present Time, Works produced since the Second London Exhibition of 1862.

(*a.*) Architecture, including models, designs, sketches, and surveys of architectural works of the present time.

(*b.*) Sculpture, including figures and groups of small sizes; engraving, medals, &c.

(*c.*) Paintings, including miniatures and enamels.

(*d.*) Graphic arts, including copper and steel engravings, etching, woodcuts, &c.

Group 26.

Education, Teaching and Instruction.

(*a.*) Education, exhibition of all the arrangements and contrivances for the better nursing, training, and rearing of children; their physical and mental development from the first days of their life up to school-time; their nourishment. Cradles, nurseries, &c.; child gardens (kinter-garten) child games, and amusements, child gymnastics.

(*b.*) Teaching. Exhibition of school houses and school apparatus in models, drawings, and examples. Exhibition of means of instruction. The works and journals of instruction. Description and illustrations of methods of instruction. History and statistics of a school, its organisation and laws.

(1.) Elementary schools. This department will include apparatus for the instruction of the blind, deaf, dumb, and idiots.

(2.) Middle schools, comprehending gymnasiums, "Realschulen" or schools wherein exact science and modern languages are taught.

(3.) Professional and technical colleges.

(4.) Universities.

(*c.*) Instruction in the more limited sense; instruction of adults through literature, the public press, public libraries, and educational societies, and associations for instruction.

All machinery is contained in Group 13, but, nevertheless the machines for working special kinds of material will be examined by the jury of the profes-

sional group to which they may belong, with the assistance also of competent machine builders. It is left to the free will of the exhibitor to choose the group in which he wishes his object to be placed should it be susceptible of being placed in more than one group.

ADDITIONAL EXHIBITIONS.

1. The history of inventions.
2. The history of industry.
3. Exhibition of musical instruments of Cremona.
4. Exhibition of the use of waste materials and their products.
5. The history of prices.
6. The representation of the commerce and trade of the world.

TEMPORARY EXHIBITIONS.

1. Live animals (horses, cattle, sheep, pigs, dogs, fowls, game, fish, &c.).
2. Butcher's meat, venison, poultry, pork, &c.
3. Dairy produce.
4. Garden produce (fresh fruits, fresh vegetables, flowers, plants, &c.).
5. Living plants injurious to agriculture and forestry.

For these exhibitions special instructions will be afterwards published.

The President of the Imperial Commission,
ARCHDUKE RAINER.

The General Manager,
Vienna, the 16th of September 1871. BARON DE SCHWARZ-SENBORN.

GENERAL REGULATIONS FOR FOREIGN EXHIBITORS AND COMMISSIONS,

ISSUED BY THE IMPERIAL AUSTRIAN COMMISSION.

1. Under the patronage of His Most Gracious Imperial and Royal Apostolic Majesty, and under the protectorate of His Imperial Highness the Archduke Charles Lewis, the Exhibition will take place in the Prater in buildings erected specially for the purpose, and in the surrounding park and gardens. It will be opened on the 1st of May 1873 and closed on the 31st of October of the same year.

2. Under the presidency of His Imperial Highness the Archduke Rainer, an Imperial Commission has been formed, for the purpose of representation and of discussing all general questions concerning the Exhibition.

3. His Majesty has entrusted the direction of the Exhibition to the Privy Councillor, Baron de Schwarz-Senborn, as Chief Manager.

4. Foreign governments are invited to appoint Commissions with whom the Chief Manager will stand in direct communication upon all affairs concerning the Exhibition. These Commissions will have to represent the interests of their countrymen in all questions relating to the Exhibition, and do their best duly to carry out its programme. Their task will be more particularly to issue invitations to take part in the Exhibition, to receive applications for space, to decide on the admission of objects announced, and to take charge of the forwarding, exhibiting, and returning of the objects of the Exhibition in accordance with the regulations laid down.

5. All communications from foreign commissions, concerning the Exhibition should be addressed: An den k. k. General-Director der Weltausstellung 1873 in Wien. (Translation: To the Chief Manager of the Universal Exhibition 1873 in Vienna, Austria.)

6. A plan of the projected Exhibition buildings and adjoining parks, showing the space alloted to each country, will be placed at the disposal of the Commissions before the 15th February 1872.

The Commissions are invited to inform the chief manager before the 1st of May 1872, whether their countrymen will require a larger or smaller space in the buildings, and also, whether they wish to have a part of the park adjoining their portion of the building.

7. The definitive division of space in the Exhibition buildings, park and gardens, resolved upon by the chief manager, will be made known to the Commissions by the 1st July 1872.

A plan showing the subdivision of the Exhibition (groups) must be sent, by the Foreign Commissions, to the chief manager at the latest by the 1st October 1872.

Lists of the Exhibitors, as well as detailed plans, showing the space allotted, and each single object to be exhibited, must be sent in by the Foreign Commissions, before the 1st of January 1873 at the latest, so that the exigencies of the respective countries may be taken into account in organizing the interior arrangement of the Exhibition buildings.

8. The exhibitors will not have to pay the expenses of a boarded floor, or of a closed ceiling, or contribute to the laying out of the adjoining gardens.

All these expenses will be paid out of the Exhibition fund; but in return a total sum will be paid by each foreign nation, for the whole space allotted to it in the Industrial-Palace and the Machinery Hall, with a given fixed ground floor, and calculated by the square meter, according to the following tariff:—

	Austrian currency.
(*a.*) In the Industrial-Palace - - -	10 fl.
(*b.*) In the Machinery-Hall - - -	4 fl.

In the other parts of the Exhibition and adjoining grounds, the charges for hired space will be calculated by square-meter, according to the following tariff:—

	Austrian currency.
(*a.*) In the court-yards of the Industrial-Palace -	4 fl.
(*b.*) In the park:	
In the open air - - - -	1 fl.
In the spaces to be covered at the expense of the exhibitor - - - - -	3 fl.

Exhibitors of objects of Fine Art and of those for the "*Exposition des Amateurs*" have no charge whatever to pay for space.

9. The chief manager will enter into communication with the Railway and Steamboat Companies of Austria and Hungary, in order to procure reductions of rates for the conveyance of objects for the Exhibition.

The Foreign Commissions are also invited to enter into communication with the Railway and Steamboat Companies of their countries for the same purpose, and to communicate by the 1st of May 1872, to the chief manager, the reductions which they have obtained.

The Chief Manager will then publish all the rates concerning these reductions by the 1st July 1872.

10. The Exhibition grounds will be considered as a bonded warehouse, and objects which are monopolies in Austria may also be exhibited without any hindrance.

11. Objects exhibited can only be removed before the closing of the Exhibition by special permission of the Chief Manager.

12. Immediately after the close of the Exhibition the exhibitors must attend to the packing and removal of their goods and fittings.

These operations must be finished by the 31st of December 1873.

The goods, packages, and erections which may not have been removed by the exhibitors or their representatives after this term has expired, will be deposited, if they are of sufficient value, in warehouses, at the cost and risk of the exhibitors.

The objects which may not have been removed out of these warehouses by the 30th June 1874 will be sold publicly; the net proceeds of the sale will be employed in augmenting the collections of an institute for promoting the instruction of small tradespeople and of workmen in Vienna.

13. The objects exhibited will be submitted to the judgment of an International Jury, for which special regulations will be published.

14. An official General Catalogue will be published, the arrangement of which will be made known later on.

In order that this Catalogue may be published in time, the Foreign Commissions are requested to send the necessary data at the latest on the 1st January 1873.

15. A *special locality* will be provided in the Exhibition grounds, where Exhibitors can sell publications relating to the Exhibition, and to the objects which they exhibit (such as illustrated catalogues, current prices, &c.).

16. Popular lectures and industrial, technical, or scientific demonstrations, will be arranged in a special lecture hall built for that purpose. Nevertheless the Chief Manager must be informed of the lectures.

17. Special regulations and programmes will be published for the works of Fine Art, for the exhibition of machinery, for additional and temporary exhibitions, for single groups, and special dispositions, as tasting pavilions, cellars, &c.

18. Each Exhibitor is engaged to acknowledge and keep the regulations.

19. Concerning the admission of goods to be exhibited, the following are the limitations fixed: explosive and detonating substances, and substances which may be considered inflammable are entirely excluded.

Spirits or alcohols, oils, corrosive salts, highly inflammable and other matters, which might spoil other objects exhibited, or annoy the public, will only be admitted in strong, moderate sized barrels, adapted for this purpose. Also the exhibitors of such objects will always be bound to conform themselves to any particular regulation the chief manager may think proper to make.

Percussion caps, materials for fireworks, lucifer matches, and other similar objects may only be exhibited in imitation, without the addition of inflammable substances.

20. Moreover the Chief Manager reserves to himself the right to remove all goods from the Exhibition buildings which may seem injurious by their quantity or nature, or which may appear incompatible with the purpose and regulations of the Exhibition.

21. The consignment of each single exhibitor must be accompanied by a certificate of admission issued by the Commission of his country.

The detailed directions concerning the contents and form of this certificate will be communicated to the Commissions by the Chief Manager.

22. The Exhibitor, or the Commissions, have to defray all the expenses for the transport of objects to be exhibited, for the reception and opening of packages, for unpacking the objects, for removing and storing the empty cases, for making tables, counters, steps, boxes for setting up the goods (products) in the Exhibition buildings or in the park, for returning the goods (products), &c.

23. The objects to be exhibited will be admitted from the 1st February until the 15th April 1873 inclusive.

This period may be changed by the Chief Manager, at a special request, in consideration of particular circumstances, as for instance for objects which would be damaged by remaining too long packed up, or for objects of great value; but in each case, everything must be prepared in advance for the exhibition of objects.

24. Special regulations will fix the time when the materials must be brought into the Exhibition grounds for constructions which form objects of the Exhibition, or disconnected apparatus or engines, heavy or very large objects, as well as those requiring special foundations.

25. All preparations for the exhibition of objects may be made in proportion to the completion of the buildings; but they must all be finished at the latest by the 15th February 1873.

26. The Commissions are invited to take care that the products of their country be sent to Vienna in as few single consignments as possible.

27. All goods intended for the Exhibition are to be marked W. A. 1873, VIENNA, and addressed to the Chief Manager.

The address must be securely fastened on the packages and contain besides the following particulars:—

(*a.*) Name or firm of the Exhibitor.

(*b.*) Country and place of residence of the same.

(*c.*) The Group to which the objects belong.
(*d.*) Number of application.
(*e.*) A specification of the number of pieces of each single consignment; if the exhibitor has only sent one package, it will be marked No. 1, but if the same exhibitor has several packages to exhibit, their number must be marked on each package by a fraction; for instance, $\frac{1}{6}$, $\frac{2}{6}$, and so on. The figure 6 means that 6 pieces have been sent, of which the one is No. 1, the other is No. 2, &c. The persons appointed to receive the objects will thus be enabled to know immediately after the arrival of the goods whether a consignment is complete, or whether a package is missing and which number it is. If several small packages be packed in one large box, only objects belonging to the same group must be put into this box, which must then be marked as mentioned above.

The cases must bear the same mark inside, on the top and bottom, in order to prevent mistakes being made with the shifting of the different parts of the cases.

(*f.*) The place where the objects are to be exhibited, *i.e.* Industrial-Palace, Park, or Machinery Hall.

The addresses will be of different colours in order that the goods may be recognised the more easily, and the Chief Manager will communicate in time to the appointed Foreign Commissions the colour of the address of the packages of their country.

Form of address:

W. A. 1873, WIEN.

An den k. k. General-Director der Weltausstellung, 1873 Wien.

Ausstellungsort:
(z. B. Industrie-Pallast, Park oder Maschinenhalle.)

Namen oder Firma des Ausstellers	
Land und Wohnort	
Gruppe	
Ordnungszahl der Anmeldung	
Bruchzahl des Collo ($\frac{1}{1}$ oder $\frac{2}{3}$ u. s. f.)	

Translation:—

W. A. 1873, VIENNA.

To the Chief Manager of the Universal Exhibition, 1873 Vienna.

Place of Exhibition:
(for instance: Industrial-Palace, Park, or Machinery Hall.)

Name or Firm of the Exhibitor	
Country and place of residence	
Group	
Number of application for admission	
Number of package ($\frac{1}{1}$ or $\frac{2}{3}$, and so on)	

A list of the contents of each single package must be placed inside the package, in order that the objects may be put the more easily in their right place, and to facilitate the manipulation of the Custom House.

28. The Commissions or the Exhibitors themselves or their agents are responsible for the forwarding, receiving, and unpacking the packages, and the proper delivery of their contents; and afterwards for the arrangement, surveyance, and returning of the objects exhibited; only such agents will be admitted who have proved to the Chief Manager that they are the authorised agents of the Foreign Commissions.

29. If the person who has to receive the goods is not present at the Exhibition when they arrive, they will be at once stored up at the cost and risk of the respective Commissions.

30. The motive power for engines and machinery will be placed gratis at the disposal of the exhibitors.

The necessary force of motion is transmitted by a horizontal revolving shaft, the position, diameter, and number of revolutions per minute of which will be published in time by the Chief Manager.

The Exhibitors must furnish all the pulleys for this principal transmission, as well as the gearing necessary, together with the cross-shafts, pulleys, and straps.

A special regulation will be published for the machinery department.

31. The Chief Manager will, if desired, give the name of contractors who have applied to him for the execution of the arrangement of the Exhibition; yet the Chief Manager will take upon himself no responsibility for their performances; the Exhibitors have nevertheless the right to choose their own contractors and workmen.

32. Packages or empty cases cannot be deposited upon the space necessary for circulation. The packages must be unpacked directly after their arrival and the packing cases and materials must be removed at once.

33. Between the 15th February and the 25th April 1873, the objects already lying on the Exhibition grounds, and unpacked, must be put in order and arranged.

In order to have the objects equally apportioned in the spaces of the Exhibition, the Chief Manager reserves to himself the right, on the 25th of April 1873, to dispose of those places which do not contain sufficient objects.

The days from the 26th to the 29th April will be employed in cleaning the localities and in inspecting the whole Exhibition.

34. There will be published special regulations for the arrangement and erection of those products and objects which will be exhibited in the Park.

Roads of communication and earthworks may only be constructed and made according to the plans arranged between the Chief Manager and the Foreign Commissions.

35. The objects will be exhibited under the name of the manufacturer. If the manufacturer agrees to it, they may also be exhibited under the name of the business man who has them in warehouse.

36. The Exhibitors are invited to add to their name or firm, also the name of those persons who have taken a notable part in the production of an object, either as inventors, draughtsmen, or modellers.

37. The Exhibitors are also invited to quote the price in cash, and place of sale on the objects exhibited.

38. The Chief Manager has taken the necessary steps, that the objects exhibited may, from the time of the arrival on the Exhibition Grounds, until taken away (*vide* No. 12 of these regulations), enjoy the benefit of the laws existing in Austria, for the protection against piracy of inventions and designs, for instance, of the patent and registration law. Detailed regulations will be published.

Reproductions (designs, photographs, &c.) of objects exhibited are only allowed, if the Exhibitor and the Chief Manager consent to it.

39. It is left to the exhibitors to insure the objects exhibited against damage by fire, at their own expense.

40. The Chief Manager will make provision for preserving from damage the products exhibited, as far as possible; he will also appoint persons to take care of the objects. Nevertheless, the Chief Manager will take upon himself no responsibility for damage of any kind whatever.

41. Each Exhibitor will receive a ticket entitling him to free admittance.

Any agent, duly appointed by the Exhibitor, will also receive a ticket, entitling him to free admittance.

An agent representing more than one Exhibitor can only obtain one ticket.

The arrangements concerning the distribution and the control of tickets will be published later on.

42. A special regulation will be published for the arrangement of the interior service.

42, Praterstrasse.
January 27, 1872.
Vienna.

The President of the Imperial Commission:
ARCHDUKE RAINER.
The Chief Manager:
BARON DE SCHWARZ-SENBORN.

BRIEF SUMMARY OF THE CONDITIONS UPON WHICH THE EXHIBITION WILL BE CONDUCTED.

The programme and regulations issued by the Imperial Austrian Commission furnish full information as to the principles upon which the Imperial Government propose to conduct the Exhibition of 1873, and an attentive perusal of the same is recommended to all those who desire to co-operate in securing a fair representation of British industry on that occasion.

Principal Conditions.

1. The relative duties of the Royal Commission, of British and Colonial Exhibitors, and of the Austrian Commission, as set forth in the appointment of the Royal Commissioners and in the Austrian General Regulations are as follows:—

a. The Royal Commission is appointed to represent the British and Colonial exhibitors, to advise as to the best mode of procuring and forwarding their objects and products to the Exhibition, and to report on the same.

b. The Royal Commission having no public funds at their disposal, exhibitors will have to defray all expenses, including rental of space, transport of goods, and all other charges not provided for by the Imperial Austrian Commission.

c. The Austrian Commission will communicate with exhibitors from foreign countries solely through the commission appointed by each country for that purpose.

2. The Exhibition will open in Vienna on the 1st May and close on 31st October 1873.

3. Lists of the exhibitors, with detailed plan of space required, must be sent in to the chief manager at Vienna before 1st January 1873.

4. No liability on the part of the exhibitors for ceilings, boarded floors, or the laying out of the gardens; the cost of these will be defrayed by the Imperial Commission.

The motive-power for machinery will be supplied gratis.

5. The Austrian Regulations state that the price to be charged to each foreign country for the entire area of space demanded, will be, in the Industrial Palace at the rate of 10 florins = 1*l.* per square meter (a square meter contains about 10¾ square feet), and in the machinery hall at the rate of 4 florins = 8*s.* per square meter.

In the other parts of the Exhibition and grounds the rent per square meter will be—

	£	*s.*	*d.*
In the courtyards of the Industrial Palace	0	8	0
In the Park:—			
Open air	0	2	0
In spaces covered at expense of exhibitor	0	6	0

6. Exhibitors of Fine Arts are exempted from any charge for space.

7. Arrangements are to be made by the Austrian Commission for the reduction of the transport charges in Austria and Hungry; other commissions are invited to try to effect the same in their several countries.

8. Goods for exhibition to be considered as bonded and exempt from customs duties.

9. Exhibitors or their agents are responsible for the packing, forwarding, receiving, and unpacking of their goods, both for the opening and the close of the exhibition. And the owner, agent, or consignee must be present. The removal of objects after the Exhibition must be completed before the 31st December 1873.

10. The objects will be submitted to the judgment of an International Jury.

11. Special regulations will be issued to the Fine Arts, machinery, and the temporary exhibitions.

12. The usual prohibitions and limitations respecting the exhibition of explosive substances are notified.

13. Objects for exhibition will be received at Vienna from 1st February until the 15th April 1873.

14. Special regulations will be published respecting constructions, and very large objects; also for those requiring foundations. All preparations for the exhibition of such objects must be completed by 15th February 1873.

15. The Chief Manager reserves to himself the right to dispose of such places as shall not be properly occupied on the 25th April 1873.

16. The objects exhibited will be protected against piracy of inventions or designs. Reproductions, photographs, &c., will only be allowed with the joint consent of the exhibitor and the Chief Manager.

17. Insurances against fire, &c., when considered necessary by the exhibitor, to be effected by him at his own expense.

18. Exhibitors and their agents will receive tickets entitling them to free admission to the Exhibition.

APPENDIX.

AUSTRIAN TARIFF OF IMPORT DUTIES.

HER Majesty's Commissioners, having procured through the Austrian authorities the latest official edition of the Austro-Hungarian Tariff of Import Duties upon Articles of British Produce and Manufactures, have caused the same to be translated and arranged for the convenience of British exhibitors in groups, in accordance with the classification of objects adopted for the Vienna Universal Exhibition of 1873.

It is to be observed that, according to the Official Regulations, the Exhibition grounds and buildings will be considered as a BONDED WAREHOUSE; goods for exhibition will therefore be exempt from customs duties. Goods not returned to this country at the close of the Exhibition will, however, be liable to the rates of import duty as fixed by the Austro-Hungarian customs tariff.

41, Parliament street, London,
April, 1873.

APPENDIX.

AUSTRIAN TARIFF of IMPORT DUTIES upon the PRINCIPAL ARTICLES of BRITISH PRODUCE and MANUFACTURE at the VIENNA UNIVERSAL EXHIBITION, 1873, prepared by Her Majesty's Commissioners, for the guidance of British Exhibitors.*

I. a.—EXTRACT.

From the Return "of the *Lowest* and *Highest* Rates of IMPORT DUTY levied "by the TARIFF of each Country in EUROPE and of the UNITED STATES, "upon some of the principal Articles of MERCHANDISE, in each of the "years 1860 and 1870; showing the per-centage INCREASE or DECREASE "of such Duties in the year 1870."

(Return to an Order of the Honourable the House of Commons, dated 11th February, 1870.)

AUSTRIA.

DESCRIPTION OF ARTICLES.	Unit of Weight or Measure.	Lowest and Highest Rates of Import Duties. 1860.	Lowest and Highest Rates of Import Duties. 1870.	Per-centage Increase or Decrease in 1870.
		£ s. d.	£ s. d.	Per cent.
Yarns—cotton, of all kinds	Cwt.	From 0 10 8	From 0 8 2	*Decrease* - 24
		To 1 6 9	To 0 15 3	„ - 32
Yarns—linen	Cwt.	From 0 5 3	From 0 1 6½	*Decrease* - 72
		To 1 6 9	To 0 12 2	„ - 55
Yarns and thread—silk	Cwt.	From 0 16 3	From Free	Duty removed.
		To 1 12 0	To 0 12 2	*Decrease* - 62
Yarns — woollen and worsted	Cwt.	From 0 10 8	From 0 1 6½	*Decrease* - 86
		To 1 6 9	To 0 12 2	„ - 55
Cotton manufactures — piece goods	Cwt.	From 4 5 4	From 1 12 6	*Decrease* - 62
		To 10 13 4	To 4 11 5	„ - 57
Linen manufactures — piece goods	Cwt.	From 1 12 0	From 0 12 2	*Decrease* - 62
		To 10 13 4	To 6 1 11	„ - 43
Silk and half silk manufactures — piece goods	Cwt.	From 0 2 9	From 0 1 1	*Decrease* - 60
		To 0 4 9	To 0 2 2	„ - 54
Woollen and Worsted manufactures — piece goods	Cwt.	From 5 6 8	Form 1 16 7	*Decrease* - 66
		To 10 13 4	To 5 1 7	„ - 52
Hosiery—cotton	Cwt.	8 0 0	3 0 11	*Decrease* - 62
Hosiery—silk	Cwt.	From 0 2 9	From 0 1 1	*Decrease* - 60
		To 0 4 9	To 0 2 2	„ - 54
Hosiery—woollen	Cwt.	8 0 0	3 11 1	*Decrease* - 56
Patent net	Cwt.	26 13 4	Furniture 3 0 11	*Decrease* - 89
			Other kinds 6 1 11	„ - 77

* Compiled by Dr. F. L. Weinmann.

Description of Articles.	Unit of Weight or Measure.	Lowest and Highest Rates of Import Duties. 1860.	Lowest and Highest Rates of Import Duties. 1870.	Per-centage Increase or Decrease in 1870.
		£ s. d.	£ s. d.	Per cent.
Cotton lace	Cwt.	26 13 4	6 1 11	*Decrease* - 77
Ribbons—silk and velvet	Cwt.	From 0 2 9 To 0 4 9	From 0 1 1 To 0 2 2	*Decrease* - 60 „ - 55
Iron — unwrought and wrought:				
Pig	Cwt.	0 0 10¼	0 0 6	*Decrease* - 40
Bar	„	From 0 4 3¼ To 0 10 8	From 0 2 6¼ To 0 3 6¾	„ - 40 „ - 66
Railroad	„	0 5 4	0 2 6¼	„ - 53
Castings, coarse	„	0 2 1¾	0 1 2⅝	„ - 43
Plates and sheets	„	From 0 8 6 To 0 10 8	From 0 4 0⅝ To 0 8 2	„ 52 to 24
Cutlery	Cwt.	From 1 1 4 To 5 6 8	From 0 8 2 To 1 10 6	*Decrease* - 62 „ - 72
Tin plates	Cwt.	0 10 8	0 8 2	*Decrease* - 24
Machinery, all kinds	Cwt.	From 0 8 6 To 1 12 0	From 0 2 8½ To 0 8 2	*Decrease* - 68 „ - 75
Cast wares	Cwt.	From 0 10 8 To 1 12 0	From 0 4 0¾ To 0 12 2	*Decrease* - 62 „ - 62
Copper and brass:				
Copper—				
Unwrought	Cwt.	0 1 7½	Free.	Duty removed.
Part wrought	„	0 16 3	0 6 1	*Decrease* - 63
Wrought and wares	„	From 0 9 8 To 1 12 0	From 0 8 2 To 0 12 2	„ - 16 „ - 63
Lead—pig	Cwt.	0 2 1½	0 1 6¼	*Decrease* - 29
Coals	—	Free.	Free.	—
Alkali—soda	Cwt.	From 0 0 10¼ To 0 10 8	From 0 0 9¾ To 0 3 1	*Decrease* - 5 „ - 72
Earthenware and Porcelain:				
Earthenware	Cwt.	From 0 10 8 To 1 1 4	From 0 5 1 To 0 9 2	*Decrease* - 53 „ - 57
Porcelain	Cwt.	From 1 12 0 To 4 5 4	From 0 5 1 To 0 12 2	*Decrease* - 84 „ - 85
Fish—salted or smoked:				
Herrings	Cwt.	0 3 2½	0 1 0¾	*Decrease* - 68
Other kinds	Cwt.	0 5 4	From 0 1 6¼ To 0 3 0¾	*Decrease* - 72 „ - 43
Salt—white and rock	Cwt.	Prohibited.	Prohibited.	—
Sugar—refined	Cwt.	1 6 9	1 6 9	No change.

Note.—This Return affords a general indication of the alterations made between 1860 and 1870 in the import duties levied by the Customs tariff of Austria-Hungary.

As many of the articles enumerated in the Return are subject to several rates of duty, according to their different qualities and descriptions, alterations in the lowest or highest rates do not always show the largest or the most important tariff modifications.

It may also be observed that a great per-centage decrease in rates of duty may be shown without the amount of duty being sufficiently reduced to permit of International trade.

I. b.

RETURN furnished by the STATISTICAL and COMMERCIAL DEPARTMENT of the BOARD of TRADE of the QUANTITIES and VALUE of the Principal and other ARTICLES of BRITISH PRODUCE and MANUFACTURES exported to AUSTRIAN TERRITORIES (Illyria, Croatia, and Dalmatia), and to the Danubian Principalities (Wallachia and Moldavia), in the year 1871.*

(*a.*) EXPORTS to AUSTRIAN TERRITORIES (Illyria, Croatia, and Dalmatia).

Principal and other Articles.	Quantities.		Value.
			£
Alkali	cwts.	47,843	21,625
Coals, cinders, and patent fuel	tons	98,327	50,285
Cotton yarn	lbs.	3,084,505	175,974
Cottons, entered by the yard	yards	14,048,770	229,042
„ „ at value	value	—	21,201
Fish, of all sorts „	„	—	10,331
Hardwares and cutlery, not enumerated, *ad valorem.*	„	—	7,287
Jute manufactures	yards	1,233,780	22,380
Leather, wrought and unwrought	value	—	84,020
Linens, entered by the yard	yards	605,668	18,256
„ „ *ad valorem*	value	—	18,350
Machinery, steam engines	„	—	7,201
„ all other sorts	„	—	29,803
Metals:—			
Iron, wrought and unwrought	tons	79,942	528,108
Copper „ „	cwts.	11,492	41,018
Oil-seed	gallons	1,118,297	149,636
Woollens, entered by the yard	yard	1,279,944	61,980
„ „ *ad valorem*	value	—	3,083
All other articles „	„	—	108,772
Total	—	—	1,588,852

* NOTE.—The above Returns relate only to the direct trade by sea. There are no statistics of British merchandise entering the Austrian dominions indirectly through third countries.

(*b.*) EXPORTS to the DANUBIAN PRINCIPALITIES (Wallachia and Moldavia).*

Principal and other Articles.	Quantities.		Value.
			£
Coals, cinders, and patent fuel - - -	tons	38,928	18,675
Cotton yarn - - - - -	lbs.	3,343,170	191,460
Cottons, entered by the yard - - -	yards	12,371,000	202,481
„ „ *ad valorem* - - -	value	—	5,788
Earthen and chinaware - - -	„	—	11,600
Hardwares and cutlery, not enumerated -	„	—	16,500
Machinery and millwork - - -	„	—	20,651
Metals:—			
Iron, wrought and unwrought - -	tons	11,410	124,184
Copper „ „ - - -	cwts.	2,510	10,045
Woollens, entered by the yard - - -	yards	780,643	38,491
„ „ *ad valorem* - - -	value	—	1,261
All other articles - - - - -	„	—	64,633
Total - - -	—	—	705,769

* NOTE.—The above Returns relate only to the direct trade by sea. There are no statistics of British merchandise entering the Danubian Principalities indirectly through third countries.

(Signed) R. VALPY.

Statistical and Commercial Department,
Board of Trade,
10th February, 1873.

N.B.—While this report was in the press, the Associated Chambers of Commerce of Great Britain at their annual general meeting held in March 1874, on the motion of Mr. Stead of Bradford, seconded by Mr. Shaw, unanimously resolved that the proposal of the International Congress of Vienna for the unification of the numbering of yarns be considered by the Association.

II.—ALPHABETICAL INDEX

Of the Principal Articles of British Manufacture and Produce liable to Duty on being imported into the Austro-Hungarian Monarchy.

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
A.				
Absinthe, unsweetened	VII.	26 *a.* 1.	9 0	0 18 0
„ sweetened	„	26 *b.*	15 0	1 10 0
Aceton, pyro-acetic spirit	XX.	76 *d.* 1.	5 0	0 10 0
Acid, acetic	„	„	5 0	0 10 0
„ muriatic (hydrochloric)	IX.	37 *c.* 2.	0 25	0 0 6
„ oxalic	„	37 *f.* 1.	2 0	0 4 0
„ tannic (yellowish white, almost transparent, not crystallizable, a powder devoid of smell, and of adhesive taste)	XX.	76 *d.* 1.	5 0	0 10 0
„ tartaric	IX.	37 *e.* 1.	1 50	0 3 0
„ aloetic	XX.	76 *d.* 1.	5 0	0 10 0
Acorns	IX.	34 *c.*	Free.	
„ burnt, ground	I.	2 *a.* 1.	8 0	0 16 0
„ husks of	IX.	34 *c.*	Free.	
Agricultural products. *See* introductory remarks to Tariff			Free.	
„ **implements:**				
of wood, raw	XVI.	64 *a.*	Free.	
„ „ „ painted, varnished, &c.	„	64 *c.* 1.	1 50	0 3 0
„ „ iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ which, according to their construction or size, as well as their power, come under the description of machinery:				
„ if made of wood	XIX.	74 *a.*	1 0	0 2 0
„ „ „ cast iron	„	74 *b.*	1 33	0 2 7½
„ „ cast iron or steel	„	74 *c.*	2 0	0 4 0
„ „ metals not otherwise specified	„	74 *d.*	4 0	0 8 0
Air pumps	„	73 *b.*	Free.	
„ **guns** (Weapons)	XVII.	69 *c.* 1.	15 0	1 10 0
Alabaster (also powdered)	VIII.	32 *a.* 1.	Free.	
„ wares	XVI.	66 *b.* 1.	Free.	
		66 *b.* 2.	0 75	0 1 6
		66 *c.*	6 0	0 12 0
Albumen	XX.	76 *b.* 1.	0 75	0 1 6
„ paper	XIV.	60 *c.*	1 50	0 3 0
Albums, bound, printed, and combined with small ware or fancy articles	XXI.	79 *a.*	Free.	
Alcohol (spirits of wine)	VII.	26 *a.* 1.	9 0	0 18 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency. fl. kr.	English Value. £ s. d.
Alcoholometer	XIX.	73 *b.*	Free.	
Alder-bark (for tanning)	IX.	34 *b.*	Free.	
Alkaloid and alkaloid salts	XX.	76 *d.* 1	5 0	0 10 0
Almonds	I.	5 *a* 1.	5 0	0 10 0
„ shells of	III.	18 *h.* 1.	0 80	0 1 7½
Aloe-wood	„	„	0 80	0 1 7½
„ **fibre** (Manilla hemp)	XI.	46	Free.	
Alpaca (metallic compound, similar to packfong), raw	X.	43 *a.*	Free.	
„ drawn or rolled, and in large cast blocks	„	43 *c.* 2.	3 0	0 6 0
„ wares	XVII.	70 *c.* 2.	6 0	0 12 0
Alpaca-wool	XI.	47	Free.	
Alum	IX.	37 *e.* 2.	0 75	0 1 6
„ leather (white leather containing alum)	XV.	62 *a.* 5.	0 75	0 1 6
Aluminium (a silver-like metal), raw	X.	43 *a.*	Free.	
„ drawn or rolled, and in large cast blocks	XVII.	43 *c.* 2.	3 0	0 6 0
„ wares	„	70 *c.* 2.	6 0	0 12 0
Amber	VIII.	31 *a.*	Free.	
„ oil	IX.	33 *a.* 2.	3 0	0 6 0
„ acid (*i.e.*, succinic acid)	XX.	76 *d.* 1.	5 0	0 10 0
„ wares	XIX.	75 *c.* 1.	50 0	5 0 0
Ambergris	IX.	33 *a.* 1.	5 25	0 10 6
Ammonia, succonate, nitrate, and oxalate of ammonia, &c.	XX.	76 *d.* 1.	5 0	0 10 0
„ gum-ammoniac	IX.	33 *a.* 1.	5 25	0 10 6
„ sal-ammoniac (carbonate and sulphate of ammonia)	„	37 *e.* 2.	0 75	0 1 6
„ super-phosphate of ammonia	XXII.	80 *a.*	Free.	
Anchors and anchor chains	X.	40 *g.* 1.	1 75	0 3 6
Achovies	IV.	14 *d.*	1 50	0 3 0
Anchovy-paste	VII.	28 *e.* 1.	10 0	1 0 0
Anemoscopes (a kind of hygrometer)	XIX.	73 *b.*	Free.	
Angora (woollen stuff)	XIII.	54 *b.* 1.	15 0	1 10 0
Angora skins (not lined)	XV.	61 *a.* 2.	4 50	0 9 0
Aniline (a product of coal tar)	XX.	76 *d.* 1.	} 5 0	0 10 0
„ paper (dyed in indigo)	„	76 *d.* 1.	}	
Animals, not specially named (also skinned)	IV.	16 *c.*	Free.	
„ stuffed	„	16 *d.*	0 80	0 1 7½
„ products of, not specially named	V.	21 *b.*	0 80	0 1 7½
„ bristles of, not specially named	V.	21 *b.* 1.	0 80	0 1 7½
„ teeth of, rough or only cut	VIII.	31 *a.* 2.	Free.	
Aniseed	III.	13 *g.*	Free.	
Antimonial preparations	XX.	76 *d.* 1.	5 0	0 10 0
Antimony, regulus of	IX.	37 *a.*	Free.	
Anvils, of cast iron, raw	X.	40 *i.* 1.	0 60	0 1 2½
„ of wrought iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ polished and varnished	„	69 *c.* 3.	4 0	0 8 0
Apparatus. *See* Instruments.				
Apple wine	VII.	27	4 0	0 8 0
Apples, fresh	III.	9 *a.*	Free.	
„ dried (not boiled in sugar, like jellies)	„	9 *b.* 2.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Apricots, tariffed like apples.				
Apricot kernels	III.	13 *e.* 2.	Free.	
Aqua fortis (nitric acid)	IX.	37 *c.* 2.	0 25	0 0 6
Aqua vitæ (spirit of wine)	VII.	26 *a.* 1.	9 0	0 18 0
Arms, *i.e.*, fire-arms of all kinds, fine	XVII.	69 *c.* 1.	15 0	1 10 0
„ other kinds and parts thereof (with the exception of fire-arms)	„	69 *c.* 2.	6 0	0 12 0
Arrack	VII.	26 *a.* 1.	9 0	0 18 0
Arrowroot	I.	4. 2.	0 75	0 1 6
Arsenic	IX.	37 *a.*	Free.	
„ acid	„	„	Free.	
Asbestos	VIII.	32 *a.* 1.	Free.	
„ textures	XIII.	53 *a. b.*	0 75	0 1 6
		c. 1.	6 0	0 12 0
Asphalte	IX.	35 *a.*	Free.	
„ felt	XIV.	60 *a.* 1.	Free.	
„ linen	XIII.	56 *a.*	1 0	0 2 0
Assafœtida	IX.	33 *a.* 1.	5 25	0 10 6
Asses	IV.	15 *i.*	1 5	0 2 1
Asses' skins (mules', hinnies')	V.	17 *a.*	Free.	
Astronomical instruments	XIX.	73 *b.*	Free.	
Avignon berries (dried buckthorn berries)	IX.	34 *f.* 1.	0 80	0 1 7½
Awls, iron (for shoemakers, &c.)	XVII	69 *b.* 1.	4 0	0 8 0
„ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
Axes, of iron	„	69 *b.* 1.	4 0	0 8 0
„ polished, varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ lacquered	„	69 *c.* 2.	6 0	0 12 0
Axles, wooden, in a rough state	VIII.	29 *b.*	Free.	
„ „ finished, not painted, varnished, lacquered, or polished	XVI.	64 *a.*	Free.	
„ of iron, roughly wrought, each weighing 50 lbs. and over	„	40 *g.* 2.	1 25	0 2 6
Axles, of iron, filed, polished, also combined with iron wheels for railways	XVII.	69 *a.* 3	2 0	0 4 0
„ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
B.				
Bacon	VI.	22 *a.* 3.	1 50	0 3 0
Badgers, skins of, raw	V.	17 *a.*	Free.	
Balloons of woven stuffs	XIII.	57	According to nature of material.	
„ of collodion	XX.	76 *d.* 1.	5 0	0 10 0
Balls, of cast iron	X.	40 *i.* 1.	0 60	0 1 2½
„ of lead	„	39 *b.* 2.	2 50	0 5 0
„ of unlacquered uncoloured india-rubber	XV.	62 *c.*	6 0	0 12 0
„ of lacquered, coloured, figured india-rubber	„	62 *d.* 3.	10 50	1 1 0
„ others	-	-	According to nature of material.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Balm, oil of	XX.	76 *a.*	15 0	1 10 0
„ herbs	III.	13 *h.* 1.	0 80	0 1 $7\frac{1}{2}$
Balsams, natural	IX.	33 *b.* 1.	7 50	0 15 0
NOTE.—Natural balsams are charged like perfumery wares if they are labelled and accompanied by directions for use, &c.				
„ (of Peru, Tolu, Mecca, Aquaray, Canada)	„	„	7 50	0 15 0
„ artificial	XX.	76 *a.*	15 0	1 10 0
Bandboxes, wooden, rough, or only planed uncoloured	XVI.	64 *a.*	Free.	
„ of paper	XIV.	60 *g.* 2.	6 0	0 12 0
„ others	-	-	According to nature of material.	
Barley	III.	10 *c.*	0 18	0 0 $4\frac{1}{2}$
„ burnt, also ground	I.	2 *a.* 1.	8 0	0 16 0
„ sugar	VII.	28 *e.* 1.	10 0	1 0 0
Barometers	XIX.	73 *b.*	Free.	
Barrel organs (hand organs, bird-calls)	„	73 *a.*	3 0	0 6 0
„ „ (playthings)	-	-	According to nature of material.	
Baryta, sulphate of baryta, ground or washed	VIII.	32 *b.*	Free.	
„ artificially powdered, mixed with white lead	IX.	37 *d.* 1.	0 75	0 1 6
Baryta salts	XX.	76 *d.* 1.	5 0	0 10 0
Basket-makers' work, common	XVI.	64 *a*	Free.	
„ „ superior	„	64 *d.* 2.	6 0	0 12 0
„ „ in combination with woven or textile stuffs	XIX.	75 *b.*	75 0	7 10 0
Baskets, wooden (hampers, carriage, and washing baskets), common	XVI.	64 *a.*	Free.	
„ of chip, reed, cocoa-nut fibres, grass, seaweed, bulrush, straw	XIV.	59 *c.* 1.	2 50	0 5 0
„ others	-	-	According to nature of material.	
Bast, in its raw state	III.	13 *c.*	Free.	
„ other kinds	„	13 *h.* 1.	0 80	0 1 $7\frac{1}{2}$
„ web fabrics of, not combined with other materials	XIV.	59 *d.* 1.	6 0	0 12 0
„ „ combined with silk or other textures or interwoven with horsehair	„	59 *e.*	25 0	2 10 0
„ hats, with trimmings, per piece	XIII.	57 *c.* 3.	0 20	0 0 5
„ „ without do.	XIV.	59 *f.* 1.	262 50	26 5 0
„ ropes	XIII.	53 *a.*	0 75	0 1 6
„ wares	XIV.	59 *c.* 1.	2 50	0 5 0
	„	59 *d.* 1.	6 0	0 12 0
	„	59 *e.*	25 0	2 10 0
Bath sponges	„	21 *b.* 1.	0 80	0 1 $7\frac{1}{2}$
Bayonets. *See also* Arms	XVII.	69 *c.* 2.	6 0	0 12 0
Beams, scale or balance, of iron	„	69 *a.* 3.	2 0	0 4 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Beaver	IV.	14 *a.*	Free.	
Bed feathers	V.	18 *d.*	Free.	
Bed plates (for railways)	XVII.	69 *a.* 3.	2 0	0 4 0
Beds. *See* Feather Beds.				
Beef grease	VI.	22 *d.*	0 80	0 1 7½
Beehives, wooden	XVI.	64 *a.*	Free.	
„ with live bees	IV.	16 *b.*	Free.	
„ with honey and wax	V	20 *a.*	0 75	0 1 6
Beer, in bottles and jars	VII.	24 *a.*	5 0	0 10 0
„ in casks or barrels	„	24 *b.*	1 50	0 3 0
„ barm and yeast	XXII.	80 *b.*	Free.	
Beetroots, burnt or ground	I.	2 *a.* 1.	8 0	0 16 0
„ „ dried	III.	9 *b.* 1.	Free.	
Bellows, of common leather	XV.	62 *c.*	6 0	0 12 0
„ of fine do.	„	62 *d.* 3.	10 50	1 1 0
Bells, of zinc, not worked	X.	42 *b.* 1.	1 25	0 2 6
„ of other base metals, each weighing more than 10 pounds, not worked	„	43 *c.* 2.	3 0	0 6 0
Bells, of cast steel, painted blue, also combined with iron cross beams	XVII.	69 *a.* 1.	4 0	0 8 0
„ others	-	-	According to nature of material.	
Benzoin	IX.	35 *c.* 1.	0 75	0 1 6
Berlin blue, red, white	XX.	76 *d.* 1.	5 0	0 10 0
Beverages, beer, in barrels	VII.	24 *b.*	1 50	0 3 0
„ vinegar, in barrels	„	25 *b.*	0 80	0 1 7½
„ brandy	„	26	9 0	0 18 0
„ wine	„	27	4 0	0 8 0
Bilberries, fresh	III.	9 *a.*	Free.	
„ leaves and stems of	„	13 *c.*	Free.	
Billiards	XVI.	64 *d.* 2.	6 0	0 12 0
Bills (bill forms), prepared, lithographed, printed, ruled	XIV.	60 *c.*	1 50	0 3 0
Bird cages	-	-	According to nature of material.	
„ **lime**	IX.	35 *b.* 2	0 42	0 0 10
„ **nets,** cotton	XIII.	52 *a.* 2	12 0	1 4 0
„ „ linen, unbeached	„	53 *a.*	0 75	0 1 6
„ „ linen, bleached, coloured	„	53 *d.* 3.	6 0	0 12 0
„ „ bleached, coloured, from jute	„	54 *a.*	4 50	0 9 0
Birds	IV.	16	Free.	
Birds' nests, for food (Indian and Chinese)	V.	21 *b.* 1.	0 80	0 1 7½
Biscuits (with the exception of ships' biscuits)	VII.	28 *e.* 1.	10 0	1 0 0
Bismuth	X.	43	Free.	
Bitumen	IX.	35 *a.*	Free.	
Blacking	XX.	76 *b.* 1.	0 75	0 1 6
Bladders, animal, fresh, salted, or dried	V.	21 *b.* 2.	0 75	0 1 6
Blades (of swords, sabres) [weapons]	XVII.	69 *c.* 2.	6 0	0 12 0
Blasting bands	XX	78 *a.*	Free.	
Blinds of coloured or uncoloured wooden rollers (bars), combined by means of cloth linings, textures, or girths	XVI.	64 *d.* 2.	6 0	0 12 0
„ others	-	-	According to nature of material.	

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency. fl. kr.	English Value. £ s. d.
Bloodstone, raw	VIII.	32 *a.*	Free.	
„ powdered or washed	„	32 *d.* 2.	Free.	
Blotting paper, grey	XIV.	60 *a.* 1.	Free.	
Bobbinet, of cotton (superfine)	XIII.	52 *d.*	60 0	6 0 0
„ of silk (fine)	„	55 *a.*	80 0	8 0 0
Bodices (corsets and stays)	„	57 *a.* 1.	25 0	2 10 0
„ with busks made of iron or brass				
„ „ covered with leather	XV.	62 *d.* 3.	10 50	1 1 0
„ „ made of whalebone	XVI.	63 *b.* 2.	6 0	0 12 0
„ „ „ steel	XVII.	69 *c.* 2.	6 0	0 12 0
Bodices, with busks, covered over with woven stuff	XIX.	75 *b.* 3.	25 0	2 10 0
Bolsters, same as beds. *See* Mattrasses.				
Bonbons	VII.	28 *e.* 1.	10 0	1 0 0
Bone wares, &c.	XVI.	63 *b.* 1.	15 0	1 10 0
	„	63 *b.* 2.	6 0	0 12 0
„ marrow	VI.	22 *d.* 1.	Free.	
„ charcoal (bone-black)	XXII.	80 *d.*	Free.	
„ glue	XX.	76 *b.*	Free.	
„ dust	XXII.	80 *d.*	Free.	
„ „ for manure	„	„	Free.	
„ lather (clay)	„	80 *b.*	Free.	
Bones	VIII.	31 *a.* 1.	Free.	
„ rasped, broken-up	XXII.	80 *d.*	Free.	
Bookbinders' articles	XIV.	60 *g.* 2.	6 0	0 12 0
	XIX.	75 *b.* 1.	75 0	7 10 0
	„	75 *b.* 3.	25 0	2 10 0
	„	75 *c.* 1.	50 0	5 0 0
„ **cloth**	XIII.	52 *b.* 1.	16 0	1 12 0
	„	52 *b.* 2.	20 0	2 0 0
	„	52 *b.* 3.	30 0	3 0 0
Books, printed, bound and unbound, with or without pictures and illustrations, &c.	XXI.	79 *a.*	Free.	
Boot irons (heels) with holes, filed, only slightly polished	XVII.	69 *a.* 3.	2 0	0 4 0
„ **trees**	XVI.	64 *a.*	Free.	
„ **jacks,** wooden	„	„	Free.	
„ **legs,** uppers of blackened leather	XV.	62 *a.* 4.	3 0	0 6 0
Boots, same as shoes.				
Borax, raw	IX.	37 *a.*	Free.	
refined	„	37 *e.* 1.	1 50	0 3 0
Borders and trimmings for shawls of wool, silk, &c.	XIII.	52 *e.* 2.	50 0	5 0 0
„ brims, for straw hats and bonnets	XIV.	59 *e.*	25 0	2 10 0
Bottles of ordinary green, black, yellow, not pressed, smoothed, ground glass covered over with reed grass twisted into thin cords, with straw or with peeled or unpeeled willow twigs	XVI.	65 *a.* 1.	0 75	0 1 6
„ covered over with common leather (also combined with bands and woven stuffs)	„	65 *e.* 2.	6 0	0 12 0
„ covered over with fine leather (also combined with bands or woven stuffs)	XV.	62 *d.* 2	15 0	1 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Bottles, of fine leather, combined with basket-work	XVI.	65 *e.* 2.	6 0	0 12 0
„ others	- -	- -	According to nature of material.	
Boys' marbles, of marble	„	67 *b.* 1.	2 50	0 5 0
„ „ others	- -	- -	According to nature of material.	
Bracelets, straw, upon strings	„	59 *f.* 3.	15 0	1 10 0
„ paper, ditto	„	60 *g.* 1.	12 50	1 5 0
„ leather or India rubber, ditto	XV.	62 *d.* 2.	15 0	1 10 0
„ bones, ivory, &c.	XVI.	63 *b.* 1.	15 0	1 10 0
„ wood	„	64 *d.* 1.	12 0	1 4 0
„ glass	„	65 *e.* 1.	15 0	1 10 0
„ clay	„	67 *d.* 1.	15 0	1 10 0
„ lead	XVII.	68 1.	12 0	1 4 0
„ iron	„	69 *c.* 1.	15 0	1 10 0
„ other metals	„	70 *c.* 1.	15 0	1 10 0
„ gold or silver	XIX.	75 *a.*	75 0	7 10 0
„ purely gilt or silver plated, or foiled with gold or silver	„	75 *b.* 1.	75 0	7 10 0
„ elegantly finished, combined with ivory, enamel, &c.	XVII.	70 *c.* 1.	15 0	1 10 0
„ of common metals of fine workmanship	XIX.	75 *c.* 2.	25 0	2 10 0
Braces, linen, unbleached	„	53 *a.*	0 75	0 1 6
Bran	XXII.	80 *b.*	Free.	
Branches (twigs) not specially named	III.	13 *h.* 1.	0 80	0 1 7½
Brandy	VII.	26 *a.* 1.	9 0	0 18 0
„ scales (alcoholometers)	XIX.	73 *b.*	Free.	
Brass, raw	X.	43 *a.*	Free.	
„ scoured	XVII.	70 *c.* 2.	6 0	0 12 0
„ plated	„	„	6 0	0 12 0
„ wire	X.	43 *c.* 2.	3 0	0 6 0
„ strings	„	43 *c.* 1.	4 0	0 8 0
„ sheet, wares. *See* Metal wares.				
Brazilian grass, of a red colour, looking as if dyed	III.	13 *c.*	Free.	
Breaks for railway carriages	XVII.	69 *a.* 3.	2 0	0 4 0
Bricks (roof and wall) of clay	VIII.	32 *a.* 1.	Free.	
„ (hollow and plaster) of inferior potters' clay, painted, glazed	XVI.	67 *a.* 1.	0 25	0 0 6
„ clay for (inferior)	VIII.	32 *a.* 3.	Free.	
Brimstone. *See* Sulphur.				
Brine	IX.	36	0 42	0 0 10
Britannia metal	X.	43 *a.*	Free.	
„ „	„	43 *b.*	2 0	0 4 0
„ „	„	43 *c.* 2.	3 0	0 6 0
Britannia metal wares	XVII.	70 *a.* 1.	4 0	0 8 0
	„	70 *a.* 2.	2 50	0 5 0
	„	70 *c.* 2.	6 0	0 12 0
Bronze wares, wood, bronzed	XVI.	64 *d.* 2.	6 0	0 12 0
„ „ metallic	XVII.	70 *c.* 2.	6 0	0 12 0
„ **metal**	X.	43 *a.*	Free.	
	„	43 *c.* 2.	3 0	0 6 0
„ **powder**	XVII.	70 *c.* 2.	6 0	0 12 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency. fl. kr.	English Value. £ s. d.
Bristles	V.	18 *a.*	Free.	
Brushes, common	XIV.	58 *a.*	1 0	0 2 0
„ fine	„	58 *b.* 1.	6 0	0 12 0
	„	58 *b.* 2.	1 0	0 2 0
„ most common	„	59 *a.*	0 25	0 0 6
„ superfine	„	64 *d.* 2.	6 0	0 12 0
Buckets (fire extinguishing) of twined or twisted hemp (but not of linen hemp)	XIII.	53 *a.*	0 75	0 1 6
„ „ „ of unbleached canvas	„	53 *c.* 1.	6 0	0 12 0
„ wooden, rough	XVI.	64 *a.*	Free.	
„ „ coloured, stained, varnished, polished, lacquered	„	64 *c.* 1.	1 50	0 3 0
„ of inferior leather or uncoloured india-rubber or gutta-percha	XV.	62 *c.*	6 0	0 12 0
„ iron, also coppered, tinned	XVII.	69 *a.* 1.	4 0	0 8 0
„ others	-	-	According to nature of material.	
Buckles, iron, coarse, also tinned, coppered	XVII.	69 *a.* 1.	4 0	0 8 0
„ superior, of iron wire	„	69 *c.* 2.	6 0	0 12 0
„ others	-	-	According to nature of material.	
Buds. *See* Flowers.				
Buffalo-hides, raw	V.	17 *a.*	Free.	
Bulls	IV.	15 *a.*	4 20	0 8 5
„ hides of, raw	V.	17 *a.*	Free.	
Busts (sculptures) of stone, under 10 lbs.	XVI.	66 *c.*	6 0	0 12 0
„ „ above 10 lbs.	„	66 *b.* 2.	0 75	0 1 6
„ „ stearin, or gypsum united with stearin	„	77 *b.*	5 25	0 10 6
Butter, fresh, salt, or melted	VI.	22 *a.* 2.	2 0	0 4 0
Buttons, gold, silver, mounted precious stones, pearls, corals, &c.	XIX.	75 *a.*	75 0	7 10 0
„ gold and silver, in other combinations	„	75 *b.* 1.	75 0	7 10 0
„ of base metals, real gilt, plated	„	75 *b.* 3.	25 0	2 10 0
„ imitation gilt, plated	„	75 *c.* 2.	25 0	2 10 0
„ others	-	-	According to nature of material.	
Button-makers' goods, cotton	XIII.	52 *b.* 3.	30 0	3 0 0
„ „ linen	„	53 *e.*	40 0	4 0 0
„ „ woollen	„	54 *c.* 2.	35 0	3 10 0
„ „ silk	„	55 *a.* 1.	80 0	8 0 0
„ „ half silk	„	55 *b.* 3.	60 0	6 0 0
C.				
Cadmium metal, raw	X.	43 *a.*	Free.	
„ drawn or rolled or in large cast blocks	„	*c.* 2.	3 0	0 6 0
preparations of	XX.	76 *d.* 1.	5 0	0 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Cages (bird cages)	- -	- -	According to nature of material.	
Cakes (eatable)	VII.	28 *e.* 1.	10 0	1 0 0
„ crushed	XXII.	80 *b.*	Free.	
Calves	IV.	15 *c.*	0 42	0 0 10
„ hides, raw	V.	17 *a.*	Free.	
Cambric, linen	XIII.	53 *f.*	60 0	6 0 0
„ cotton	„	52 *c.* 1.	30 0	3 0 0
		52 *c.* 2.	45 0	4 10 0
Camels' hides, raw	V.	17 *a.*	Free.	
Cameos	XVI.	65 *d.* 1.	6 0	0 12 0
			Or 10 per cent. ad valorem.	
Camera obscura	XIX.	73 *b.*	Free.	
Camomile flowers	III.	13 *h.* 1.	0 80	0 1 7½
Camphor, spirits of	XX.	76 *a.*	15 0	1 10 0
„ raw	IX.	35 *d.* 2.	0 80	0 1 7½
„ purified	„	33 *a.* 1.	5 25	0 10 6
Camphor, raw	„	35 *a.*	Free.	
„ purified	„	33 *a.* 1.	5 25	0 10 6
Candied articles of consumption	VII.	28 *e.* 1.	10 0	1 0 0
Candles, wax, wax torches, wax tapers	XX.	77 *a.*	8 0	0 16 0
„ stearine, paraffine, spermaceti	„	77 *b.*	5 25	0 10 6
„ tallow	„	77 *c.*	3 15	0 6 3½
Candlesticks. *See* Lamps.				
Candy, sugar	I.	7 *a.*	13 15	1 6 3½
Cane, unsplit, unstained	VIII.	31 *a.* 1.	Free.	
„ common, split	XIV.	59 *b.*	0 25	0 0 6
„ stained or coloured	„	59 *c.* 2.	2 50	0 5 0
„ waste	VIII.	31 *a.* 1.	Free.	
„ **hats,** with trimming	XIII.	57 *c.*	85 0	8 10 0
„ „ without trimming	XIV.	59 *d.* 1.	6 0	0 12 0
„ **goods,** combined with other materials	„	59 *e.*	25 0	2 10 0
„ „ not combined with other materials	„	59 *d.* 1.	6 0	0 12 0
Canes (thateh and weaver's reeds), also split, cut, and pointed for stays	III.	13 *c.*	Free.	
Canes, superior descriptions	VIII.	31 *a.* 1.	Free.	
Cannons (weapons) of cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ „ „ others	XVII.	69 *a.* 1.	4 0	0 8 0
„ cast from base metals, rough	X.	43 *c.* 2.	3 0	0 6 0
„ as playthings	- -	- -	According to nature of material.	
Cantharides (Spanish flies)	IX.	33 *a.* 1.	5 25	0 10 6
Canvas (for embroidering) of cotton	XIII.	52 *a.* 2.	12 0	1 4 0
„ „ linen	„	53 *c.* 1.	6 0	0 12 0
„ „ silk	„	55 *a.*	80 0	8 0 0
Caparisons	„	57	25 0	2 10 0
Capers	VII.	28 *d.* 1.	8 0	0 16 0
Capillary syrup (capillaire, not crystallizable)	I.	7 *d.*	3 15	0 6 3½
Capons	IV.	16 *c.*	Free.	
Caps, percussion (and capsules), filled	XX.	78 *a.*	Free.	
„ „ „ empty	XVII.	70 *c.* 2.	6 0	0 12 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Caps, leather	XVI.	62 *a.* 1.	5 50	0 11 0
„ covered with fur	XV.	61 *b.*	50 0	5 0 0
„ not covered over with fur	„	61 *a.* 2.	4 50	0 9 0
„ others. *See* clothing.				
Caraway	III.	13 *g.*	Free.	
Carbolic acid (disinfecting powder)	VIII.	32 *d.* 1.	0 80	0 1 7½
Cards, playing (subject to stamp duty)	XIV.	60 *f.*	3 0	0 6 0
Carmine	XX.	76 *d.* 1.	5 0	0 10 0
Carpets (rugs), of cow, dog, and calves' hair	XIII.	54 *a.*	4 50	0 9 0
„ of other animal wools or hair, printed or unprinted	„	54 *b.* 1.	15 0	1 10 0
„ others, *see* coverlets.				
Carriage axles, of wrought iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ iron-work, only partially ground or painted	„	„	2 0	0 4 0
„ „ completely ground or varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ lacquered, polished	„	69 *b.* 2.	6 0	0 12 0
„ „ of other base metals	„	70 *c.* 2.	6 0	0 12 0
„ „ gilt or plated	XIX.	75 *b.* 3.	25 0	2 10 0
„ parts of a, rough, prepared, each part of 50 lbs. and over	X.	40 *g.* 2.	1 25	0 2 6
„ „ neither entirely ground nor varnished	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ „ of wrought iron, for railways	„	69 *a.* 3.	2 0	0 4 0
„ rugs, linen, also coloured, assorted	XIII.	53 *c.* 1.	6 0	0 12 0
„ „ of jute only	„	53 *c.* 2.	3 0	0 6 0
„ „ of coarse linen, covered over or dipped in india-rubber or gutta-percha *See also* Mats.	„	56 *c.* 3.	1 0	0 2 0
„ „ of chip, reed, bulrush, &c., uncoloured	XIV.	59 *a.*	0 25	0 0 6
„ „ „ coloured	„	59 *c.* 1.	2 50	0 5 0
„ springs	XVII.	69 *a.* 3.	2 0	0 4 0
„ grease	XX.	76 *b.* 1.	0 75	0 1 6
Carriages (passenger carriages), without leather or upholstery work	XVIII.	72 *b.*	15 75	1 11 6
„ with leather or upholstery work	„	72 *c.*	75 0	7 10 0
„ of travellers, tax free, *see* Preface to Customs' Tariff.				
„ for children (perambulators), with leather or upholstery work, not over 50 Zollpfund	XVI.	64. *d.* 1.	12 0	1 4 0
„ for children, without leather and upholstery work, not over 50 Zollpfund	„	64 *d.* 2	6 0	0 12 0
„ as well as models	- -	- -	According to nature of material.	
„ others	- -	- -	According to nature of material.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Carrots (tobacco) for snuff	II.	8 *b.*	26 25	2 12 6
Carton-pierre (paste-board dipped in tar and covered over with sand)	XIV.	60 *a.* 1.	Free.	
Cartridges, filled	XX.	78 *c.*	26 25	2 12 6
„ cases of, with copper percussion caps (capsules)	„	78 *b.*	12 0	1 4 0
„ „ with copper percussion caps and ball	„	„	12 0	1 4 0
„ „ of copper (sheet copper), brass, tombac, and other base metals, only extended, *i.e.*, shaped in the form of cartridge cases by means of a roller, but not further prepared	X.	43 *c.* 2.	3 0	0 6 0
„ „ complete	XVII.	70 *c.* 2.	6 0	0 12 0
Carved wares, wooden, superior	XVI.	64 *d.* 2.	6 0	0 12 0
Carving knife (paring knife)	XVII.	69 *b.* 1.	4 0	0 8 0
Cases, wooden	XVI.	64 *a.*	Free.	
Cashmere, cashmere shawls, &c.	XIII.	54 *e.* 2.	50 0	5 0 0
Caskets	-	-	According to nature of material.	
Cassia, lignea	I.	3 *b.*	15 75	1 11 6
„ fistula	IX.	33 *a.* 1.	5 25	0 10 6
Cast steel wire, drawn through a solution of vitriol of copper, and consequently in some places showing a thin coating of copper of a reddish yellow colour	X.	40 *f.* 2.	2 0	0 4 0
Castor oil	VI.	23	0 75	0 1 6
„ seed	III.	13 *e.* 2.	Free.	
Catgut, fresh, salted, or dried, also ropes	V.	21 *b.* 2.	0 75	0 1 6
„ spun over with silk	XIX.	75 *c.* 2.	25 0	2 10 0
„ other kinds	„	75 *d.*	25 0	2 10 0
Cattle fodder (or food for), Rarey's, made of finely-ground buckwheat and maize	III.	12	0 80	0 1 7½
„ bells, of sheet iron, soldered together	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ others	-	-	According to nature of material.	
Caustic	XX.	76 *d.* 1.	5 0	0 10 0
Caustic, lye	IX.	37 *f.* 1.	2 0	0 4 0
Caviar	IV.	14 *d.*	1 50	0 3 0
„ in boxes, bottles, or glasses	VII.	28 *e.* 1.	10 0	1 0 0
Cement (hydraulic lime) mixed with tar or rock oil	VIII.	32 *a.*	Free.	
„ (mastix) mixed with resin and other materials	XX.	76 *d.* 1.	5 0	0 10 0
Chaff	XXII.	80 *b.*	Free.	
Chains, iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ anchor, ships'	X.	40 *g.* 1.	1 75	0 3 6
„ others	-	-	According to nature of material.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Chairs, wooden (common)	XVI.	64 *a.*	Free.	
Chalk, white and black, cut	VIII.	32 *c.* 2.	Free.	
„ rough, uncut	„	32 *b.*	Free.	
„ white and black, after washing, formed into sticks and pencils, enclosed in wood and cane	XX.	76 *c.* 3.	6 0	0 12 0
„ white and black, after washing, formed into sticks and pencils, not enclosed in wood and cane	„	76 *c.* 2.	12 0	1 4 0
„ paper	XIV.	60 *c.*	1 50	0 3 0
Chamois	IV.	16 *a.*	1 58	0 3 2
„ hides, raw	V.	17 *a.*	Free.	
Charcoal	VIII.	31 *a.*	Free.	
		30 *a.*	Free.	
Cheese	V.	20 *c.*	2 20	0 4 5
Chemical products, &c.	XX.	76 *a.*	15 0	1 10 0
		76 *b.*	0 75	0 1 6
		76 *c.* 1.	15 0	1 10 0
		76 *c.* 2.	12 0	1 4 0
		76 *c.* 3.	6 0	0 12 0
		76 *c.* 4.	5 0	0 10 0
		76 *d.* 1.	5 0	0 10 0
		76 *d.* 2.	0 40	0 0 10
Chemical auxiliaries	IX.	37 *a.* & *b.*	Free.	
		37 *c.* 1.	0 40	0 0 10
		37 *c.* 2.	0 25	0 0 6
		37 *d.* 1.	0 75	0 1 6
		37 *d.* 2.	Free.	
		37 *e.* 1.	1 50	0 3 0
		37 *e.* 2.	0 75	0 1 6
		37 *e.* 3.	Free.	
		37 *f.* 1.	2 0	0 4 0
		37 *f.* 2.	1 50	0 3 0
NOTE.—If chemicals are imported in fine coverings, which by their quality belong to the class of small wares and fancy goods, they are also tariffed as such.				
Chenille, of cotton	XIII.	52 *a.* 2.	12 0	1 4 0
„ of wool	„	54 *e.* 2.	50 0	5 0 0
„ of silk	„	55 *b.* 3.	60 0	6 0 0
Cherry-laurel water (kirsch-wasser)	XX.	76 *c.* 1.	50 0	5 0 0
Cherries, fresh	III.	9 *a.*	Free.	
„ dried, parched, and jams without sugar	„	9 *b.* 2.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
Chess-boards	-	-	According to quality of material.	
Chess men	-	-	According to nature of material.	
Chestnut meal, roasted or unroasted	I.	5 *c.* 2.	0 75	0 1 6
„ „ mixed with sugar or vanilla	VII.	28 *c.* 1.	10 0	1 0 0
Chestnuts (large, French kind)	I.	5 *c.* 2.	0 75	0 1 6
Chicory	„	2 *a.* 2.	1 0	0 2 0
„ root, undried	III.	9 *b.* 1.	0 75	0 1 6
„ dried, or roasted	„	13 *h.* 2.	Free.	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Chintz, cotton	XIII.	52 *a.* 1.	16 0	1 12 0
Chip hats, with trimming	„	57 *c.* 3.	0 20	0 0 5
„ without trimming	XIV.	59 *f.* 1.	262 50	26 5 0
Chlorate of magnesia	XX.	76 *d.* 1.	5 0	0 10 0
Chloride of lime	IX.	37 *e.* 1.	1 50	0 3 0
„ **preparations**	XX.	76 *d.* 1,	5 0	0 10 0
Chloroform	„	76 *d.* 1.	5 0	0 10 0
Chocolate	VII.	28 *e.* 1.	10 0	1 0 0
Chrome, yellow and red	IX.	37 *f.* 2.	1 50	0 3 0
„ green	XX.	76 *d.* 1.	5 0	0 10 0
Cider	VII.	27	4 0	0 8 0
Cigars and cigarettes	II.	8 *b.*	26 25	2 12 6
Cigarette paper	XIV.	60 *g.* 2.	6 0	0 12 0
Cinnabar, red (sulphurate of mercury)	XX.	76 *d.* 1.	5 0	0 10 0
„ green (chrome oxide)	„	„	5 0	0 10 0
Cinnamon, genuine	I.	3 *b.*	15 75	1 11 6
„ white	III.	13 *h.* 1.	0 80	0 1 7½
Circular saws	XIX.	74 *c.*	2 0	0 4 0
Clay (earthenware)	VIII.	32 *a.* 3.	Free.	
„ jugs made of, with lid made of tin	XVI.	67 *b.* 1.	2 50	0 5 0
„ pipes (tubes)	„	67 *a.* 1.	0 25	0 0 6
„ fragments of	XXII.	80 *b.*	Free.	
„ wares (earthenwares), *i.e.*, ordinary earthenware of common argillaceous earth, with or without glazing, Dutch tiles, block or graphite utensils, flags, and similar earthenware for building purposes, crucibles, clay pipes (tubes)	XVI.	67 *a.*	0 25	0 0 6
„ „ stoneware, of one colour, or white, also white stoneware, with coloured edgings only, neither gilt nor plated	„	67 *b.* 1.	2 50	0 5 0
„ „ earthen pipes, of one colour, not painted	„	67 *b.* 2.	2 50	0 5 0
„ „ stoneware, gilt, plated	„	67 *c.* 1.	4 50	0 9 0
„ „ stoneware, of several colours, painted, printed; further, white porcelain, also with coloured edgings, neither gilt nor plated	„	67 *c.* 2.	2 50	0 5 0
„ „ porcelain, coloured, painted, printed, gilt or plated; further, earthenware of all kinds, combined with materials not coming under the category of petty or hard wares	„	67 *d.* 2.	6 0	0 12 0
Clocks, wall, and time-pieces	XIX.	75 *c.* 2.	25 0	2 10 0
„ (spring), with case and dial, if even small portions are wanting	„	„	25 0	2 10 0
„ (spring), with case, without dial	XVII.	70 *c.* 1.	50 0	5 0 0
„ electro-magnetic, with complete particular mechanisms	XIX.	75 *c.* 2.	25 0	2 10 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Clocks, for hanging up, wooden (also Schwarwald clocks with a hanging pendulum) - - -	XVI.	64 *d.* 2.	6 0	0 12 0
„ tower, iron - - - -	XVII.	69 *b.* 1.	4 0	0 8 0
„ toy - - - - - }	-	- - {	According to nature of material.	
„ as children's toy clocks - - }				
See also Watches.				
Cloth - - - - -	XIII.	54 *b.* 1.	15 0	1 10 0
„ remnants - - - -	XI.	47 *a.*	Free.	
„ makers' shears - - -	XVII.	69 *b.* 1.	4 0	0 8 0
Clothes, not entirely covered or lined with fur - - - -	XIII.	57 *a* 1.	25 0	2 10 0
„ horses, wooden, painted, lacquered, polished - - -	XVI.	64 *c.*	Free.	
„ „ wooden, without head, arms, or feet, upholstered, or covered over with woven stuff - - -	„	64 *d.* 2.	6 0	0 12 0
„ racks, wooden, common - -	„	64 *a.*	Free.	
„ „ painted, lacquered, polished	„	64 *c.* 1.	1 50	0 3 0
Clothing, and articles of dress:				
Of woven or textile goods, which are taxed in accordance with the treaty with the Customs' Union States of 9th March 1868, with 20 fl. per centner net, *i.e.*, of smooth (unassorted) thick cotton goods, rough or dressed, bleached, coloured (Tariff, Section 52 *a*, 1, *b*. 1, and 2 *a*) - - - - -	XIII.	57 *a*. 1.	25 0	2 10 0
Of assorted, rough thick cotton goods (Tariff, Section 52 *a*. 1 *b*.) - -	XIII.	57 *a*. 1.	25 0	2 10 0
Of milled woollen goods, not printed, nor like velvet - - - -	„	„	25 0	2 10 0
Of all thick linen goods, up to 100 chain threads to the Vienna current inch -	„	„	25 0	2 10 0
Of webs covered over with india-rubber or gutta-percha, dipped or combined by layers of these resins - -	„	„	25 0	2 10 0
Of webs of gum threads, combined with other spinning materials - -	„	„	25 0	2 10 0
Of assorted, thick cotton goods, bleached, coloured - - - -	„	57 *a*. 2.	45 0	4 10 0
Of all cotton goods of several colours, and of all of a red colour, and of all printed thick cotton goods - -	„	„	45 0	4 10 0
Of velvet, and textures like thereunto and of ribbon, button, lace, and stocking-maker's goods of cotton, linen, or wool - - - - -	„	„	45 0	4 10 0
Of linen goods over 100 chain threads to the Vienna current inch - -	„	„	45 0	4 10 0
Of unmilled, thick, and of all printed woollen goods - - -	„	„	45 0	4 10 0
Of all cotton, linen, and woollen, or of half-silk goods, not thick - -	„	57 *b*.	60 0	6 0 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
Clothing, &c.—*continued.*			fl. kr.	£ s. d.
Of the most superior cotton and fine silk goods	XIII.	57 *c.* 1.	85 0	8 10 0
Of the most superior linen and woollen goods	„	57 *c.* 2.	65 0	6 10 0
Clout nails (tacks, pegs, spits), iron	XVII.	69 *a.* 3.	2 0	0 4 0
Clover seed	III.	13 *f.* 1.	0 27	0 1 0½
Cloves (spice)	I.	3 *b.*	15 75	1 11 6
„ bark of	III.	13 *h.* 1.	0 80	0 1 7½
„ stalks of	I.	3 *b.*	15 75	1 11 6
„ roots of (avens)	III.	13 *h.* 1.	0 80	0 1 7½
„ (cinnamon)	„	„	0 80	0 1 7½
Clubs, wooden	XVI.	64 *a.*	Free.	
Coal	VIII.	30 *b.*	Free.	
„ powder	XX.	76 *b.* 1.	0 75	0 1 6
Coals	VIII.	30	Free.	
„ black of	XX.	76 *b.* 1.	0 75	0 1 6
Cobalt ores and regulus (white metal)	X.	38 *c.*	Free.	
„ combinations of	IX.	37 *e.* 3.	Free.	
Cocks, copper, brass, &c.	XVII.	70 *c.* 2.	6 0	0 12 0
„ others	- -	- -	According to nature of material.	
Cocoa, raw	I.	1 *a.*	8 0	0 16 0
„ ground, also paste	„	1 *b.* 2.	10 0	1 0 0
„ butter	„	1 *b.* 1.	10 50	1 1 0
„ „ mixed with sugar and spice	VII.	28 *c.* 1.	2 63	0 5 3½
Cocoa-nuts (eateable)	I.	5 *c.* 1.	0 80	0 1 7½
Cocoa-nut fibres, raw, also in hanks	III.	13 *c.*	Free.	
„ „ dyed, or otherwise dressed	„	13 *h.* 1.	0 80	0 1 7½
„ **wares**, for domestic use	XIV.	59 *c.* 1.	2 50	0 5 0
„ **oil**, in casks	VI.	23 *c.*	Free.	
„ **shells**	VIII.	31 *a.*	Free.	
Cochineal	IX.	34 *f.* 1.	0 80	0 1 7½
„ extract	„	34 *g.*	1 50	0 3 0
Cocoons	XI.	48 *a.*	Free.	
Codfish	IV.	14 *c.* 2.	0 75	0 1 6
Coffee, raw	I.	2 *a.* 1.	8 0	0 16 0
„ roasted	„	2 *b.*	10 50	1 1 0
Coin, current, small, (change) of precious or base metals	X.	44 *d.*	Free.	
„ small, not current, same as raw material thereof.				
Collodion	XX.	76 *d.* 1.	5 0	0 10 0
„ wool (also alcoholised cotton)	„	78 *d.*	262 50	26 5 0
Colophony	IX.	35 *a.*	Free.	
Colours, in shells, boxes, pastes, capsules	XX.	76 *c.* 2.	12 0	1 4 0
„ not otherwise specified	„	76 *d.* 1.	5 0	0 10 0
Colouring earths, green, red, yellow	VIII.	32 *b.*	Free.	
„ „ formed in sticks and pencils, after being washed and encased in reed or wood	XX.	76 *c.* 3.	6 0	0 12 0
„ „ not encased in reed or wood	„	76 *c.* 2.	12 0	1 4 0
Colour wares, fine, not otherwise specified	„	76 *d.* 1.	5 0	0 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Colza seed, yellow colza, (gold flower, and gold of pleasure)	III.	13 *e.* 2.	Free.	
Combmakers' goods, wooden	XVI.	64 *d.* 2.	6 0	0 12 0
„ „ of tortoiseshell	XIX.	75 *c.* 1.	25 0	2.10 0
„ „ of bone, india-rubber, or other materials, according to their nature, in so far as by their combination they do not come under the category of petty or hard-wares.				
Composite wares	-	-	According to nature of their component parts.	
Condensed milk	XX.	76 *d.* 1.	5 0	0 10 0
Cones of pine trees	III.	13 *c.*	0 6	0 0 1½
Confectionary	VII.	28 *e.* 1.	10 0	1 0 0
Cooking utensils, cast-iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ „ iron, coppered, tinned	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ iron, not enamelled	„	69 *a.* 3.	2 0	0 4 0
„ „ iron, enamelled	„	69 *b.* 1.	4 0	0 8 0
„ „ leaden	„	68 3.	4 0	0 8 0
„ „ tin	„	70 *a.* 2.	2 50	0 5 0
„ „ zinc	„	70 *a.* 1.	4 0	0 8 0
„ „ of other base metals	„	70 *b.*	4 0	0 8 0
„ „ spoons, wooden	XVI.	64 a.	Free.	
„ pots, of cast iron	XVII.	69 *a.* 3.	2 0	0 4 0
Copal	IX.	35 *d.* 2.	0 80	0 1 7½
Copper, raw	X.	43 *a.*	Free.	
„ drawn, stretched, or in coarse castings	„	43 *c.* 2.	3 0	0 6 0
„ ashes	„	43 *a.*	Free.	
„ sheets, deepened, as they come from the hammer	„	43 *c.* 2.	3 0	0 6 0
„ sheets plated	XVII.	70 *c.* 2.	6 0	0 12 0
„ wire	X.	43 *c.* 2.	3 0	0 6 0
„ „ plated	XVII.	70 *c.* 2.	6 0	0 12 0
„ printing presses	XIX.	74 *a.*	1 0	0 2 0
„ ores	X.	38 *a.* 1.	Free.	
„ dross	XXII.	80 *b.*	Free.	
„ plates (slabs)	X.	43 *c.* 2.	3 0	0 6 0
„ „ electro plated	XVII.	70 *c.* 2.	6 0	0 12 0
„ chills, as they come from the hammer	X.	43 *c.* 2.	3 0	0 6 0
„ engravings on	XXI.	79 *b.*	Free.	
„ tablets	X.	43 *c.* 2.	3 0	0 6 0
„ „ plated	XVII.	70 *c.* 2.	6 0	0 12 0
„ vitriol of	IX.	37 *d.* 1.	0 75	0 1 6
„ wares. *See* Coppersmiths' wares.				
„ rollers	XVII.	70 *b.*	4 0	0 8 0
„ percussion caps, filled	XX.	78 *b.*	12 0	1 4 0
„ „ „ empty	XVII.	70 *c.* 2.	6 0	0 12 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Coppersmiths' wares, in rough castings -	X.	43 *c.* 2.	3 0	0 6 0
„ „ further prepared, also combined with wood and iron	XVII.	70 *c.* 2.	6 0	0 12 0
Copying machines, of iron - -	„	69 *a.* 1.	4 0	0 8 0
„ „ varnished - -	„	69 *c.* 3.	4 0	0 8 0
„ „ lacquered, polished -	„	69 *c.* 2.	6 0	0 12 0
Coral-moss (sea moss) - - -	V.	21 *b.* 1.	0 80	0 1 7½
Corals, rough (also bored, but not cleansed or ground) - - -	VIII.	31 *b.*	0 75	0 1 6
„ real or imitation, worked, not mounted -	XVI.	66 *a.*	12 0	1 4 0
„ „ „ worked, mounted	XIX.	75 *a.*	75 0	7 10 0
„ of glass, coloured, painted, gilt, plated - - - -	XVI.	65 *d.* 2.	1 0	0 2 0
Cords, cotton - - - -	XIII.	52 *b.* 3.	30 0	3 0 0
„ linen - - - -	„	53 *e,*	40 0	4 0 0
„ woollen - - - -	„	54 *c.* 2.	35 0	3 10 0
„ silk - - - -	„	55	60 0	6 0 0
Cordovan leather, only blackened -	XV.	62 *a.* 4.	3 0	0 6 0
„ „ coloured - -	„	62 *b.* 1.	7 50	0 15 0
Cork, wood, in blocks (also in pieces for stripping off the bark from the twigs) - - - -	VIII.	29 *c.*	Free.	
„ stoppers (corks) -	XVI.	64 *b.*	0 75	0 1 6
„ plates - - } not combined				
„ strips - - } with other				
„ soles - - } materials -				
Corn-flowers - - - -	III.	13 *h.* 1.	0 80	0 1 7½
Corn, *i.e.*, wheat, spelt, heather-grain, buckwheat, and millet, maize (Indian corn), rye - - - -	„	10 *a.*	0 35	0 0 8½
„ spelt, in husks - - - -	„	10 *b.*	0 27	0 0 6½
„ barley and malt, oats - - -	„	10 *c.*	0 18	0 0 4
„ in sheaves - - - -	„	13 *c.*	Free.	
„ burnt, also ground - - -	I.	2 *a.* 1.	8 0	0 16 0
Cotton, raw, and cotton waste - -	XI.	45 *a.*	Free.	
„ carded - - - -	„	45 *b.*	0 53	0 1 1
„ yarn, raw - - - - *Note.*—Double thread, of different materials, for example, of one linen and one cotton thread, is classed as untwisted cotton yarn.	XII.	49 *a.* 2.	4 0	0 8 0
„ „ bleached, but not twisted -	„	49 *b.* 2.	6 0	0 12 0
„ „ twisted (threefold or more), but not dyed - -	„	49 *b.* 1.	9 0	0 18 0
„ „ dyed, twisted - - -	„	49 *c.* 1.	9 0	0 18 0
„ „ „ not twisted - -	„	49 *c.* 2.	6 0	0 12 0
„ seed - - - - -	III.	13 *e.* 1.	0 6	0 0 1½
„ goods (for particulars see Tariff, Group V.) - - -	XIII.	52 *a.–d.*	16 0	1 12 0
„ wadding, raw, or dyed - - -	XII.	49 *a.* 1.	5 25	0 10 6

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Coverlets, cotton	XIII.	52 *a.* 1.	16 0	1 12 0
„ (feet and carriage), linen, also coloured, assorted	„	53 *c.* 1.	6 0	0 12 0
„ (feet and carriage), of jute only	„	53 *c.* 2.	3 0	0 6 0
„ (feet and carriage), woollen, raised, printed and unprinted	„	54 *b.* 1.	15 0	1 10 0
„ silk	„	55 *a.*	80 0	8 0 0
„ cut out, quilted, worked, trimmed	„	57 *a.* 1.	25 0	2 10 0
„ of woven and textile stuffs, padded with cotton, wadding, silk wastes, and such like, quilted or not	„	„	25 0	2 10 0
„ (feet and carriage), of chip, reed, cocoa-nut fibres, grass, sea-weed, straw, uncoloured	XIV.	59 *a.*	0 25	0 0 6
„ (feet and carriage), coloured	„	59 *c.* 1.	2 50	0 5 0
„ of fur, lined	„	61 *b.*	50 0	5 0 0
„ „ unlined	XV.	61 *a.* 1.	4 50	0 9 0
„ of india-rubber, gutta-percha, or leather, without any other addition. Same as Leather.				
„ leather, with other additions, and further worked up	„	62 *d.* 3.	10 50	1 1 0
„ (for the feet), of vulcanized india-rubber slabs, with indentations and cavities cast in, uncoloured	„	62 *c.*	6 0	0 12 0
„ (table), of lacquered, coloured, stained, varnished, or polished strips of wood, glued upon woven or textile goods	XVI.	64 *d.* 2.	6 0	0 12 0
„ (feet, carriage, and others), of roots of trees, also combined with string, or with an under layer of woven or textile materials. Same as Basket work.				
„ of rasped cork. *See* Kamptulicon.				
„ other kinds	-	-	According to nature of material.	
Covers (lids), wooden, raw	„	64 *a.*	Free.	
„ „ painted, lacquered, polished	„	64 *c.* 1.	1 50	0 3 0
Cow-hides, raw (also East Indian, hairy on one side, and on the other covered over with a coating like lime)	V.	17 *a.*	Free.	
„ **hair,** raw	„	18 *b.*	Free.	
Cows	IV.	15 *b.*	2 10	0 4 2½
Crab's eyes	IX.	33 *a.* 1.	5 25	0 10 6
„ **butter**	VII.	28 *e.* 1.	10 0	1 0 0
Cranks, iron, rough, cast	X.	40 *i.* 1.	0 60	0 1 2½
„ wrought	XVII.	69 *a.* 3.	2 0	0 4 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Cranks, iron, as parts of a machine - -	XIX.	74 *a.*	1 0	0 2 0
Crape, of silk - - - -	XIII.	55 *a.*	80 0	8 0 0
		55 *b.*	60 0	6 0 0
Crayons, encased - - - -	XX.	76 *c.* 3.	6 0	0 12 0
„ not encased - - -	„	76 *c.* 2.	12 0	1 4 0
Creosote (carbolic acid) - - -	„	76 *d.* 1.	5 0	0 10 0
Crinoline springs and frames, finished -	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ covered with calico or other fabrics -	XIX.	75 *b.* 3.	25 0	2 10 0
Crochet needles - - - -	XVII.	69 *c.* 2.	6 0	0 12 0
Crowbars - - - - -	„	69 *a.* 3.	2 0	0 4 0
Cryolite (a colourless mineral clay) for the manufacture of aluminium metal, caustic soda (hydrate of soda, soda, and bone glass), also ground or washed - -	VIII.	32 *b.*	Free.	
Curds - - - - -	V.	21 *a.*	Free.	
Curls, of human hair - - -	XIX.	75 *b.* 1.	75 0	7 10 0
„ ready made, of silk or other textile materials - - - -	XIII.	57 *a.* 1.	25 0	2 10 0
Currants - - - - -	I.	5 *a.* 2.	2 50	0 5 0
Currie-powder - - - -	„	3 *a.*	8 0	0 16 0
Currycombs, iron - - - -	XVII.	69 *a.* 1.	4 0	0 8 0
Curtains - - - - -	-	-	According to nature of material.	
„ cotton materials for, like bobbin-net - - - - -	XIII.	52 *b.* 3.	30 0	3 0 0
Cushions. Same as Beds. *See also* Mattrasses.				
Cylinders for electric batteries - -	XIX.	73 *b.*	Free.	
„ (rollers), leaden, in rough castings	X.	39 *b.* 2.	2 50	0 5 0
„ „ „ further worked -	XVII.	68. 3.	4 0	0 8 0
„ „ zinc, in rough castings, also combined with inferior or most inferior kinds of woodwork, and rods or plates of iron	X.	42 *b.* 1.	1 50	0 3 0
„ „ „ further worked -	XVII.	70 *a.* 1.	4 0	0 8 0
„ „ tin, in rough castings, also in conjunction with inferior or most inferior kinds of woodwork, and rods or plates of iron - -	X.	43 *b.*	2 0	0 4 0
„ „ „ further prepared -	XVII.	70 *a.* 1.	4 0	0 8 0
„ „ of other base metals, in rough castings weighing more than 25 lbs.	X.	43 *c.* 2.	3 0	0 6 0
„ „ further worked -	XVII.	70 *b.*	4 0	0 8 0
„ „ as parts of machinery -	XIX.	74 *a.*	1 0	0 2 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Cylinders, (rollers), others, according to the nature of the material *See* Copper Rollers.				
„ „ coverings for (endless felt), woollen	XIII.	54 *a.*	4 50	0 9 0
D.				
Damask, of linen (for particulars, *see* Tariff, Group V.)	XIII.	53.	According to quality.	
„ of wool, do. do.	„	54.	„	
„ of silk, do. do.	„	55.	„	
Dates	I.	5 *a* 1.	5 0	0 10 0
Decimal scales	XVII.	69 *a* 1.	4 0	0 8 0
„ varnished	„	69 *c.* 3.	4 0	0 8 0
„ lacquered and polished	„	69 *c.* 2.	6 0	0 12 0
Decorations (for theatres), painted on linen or paper	XXI.	79 *b.*	Free.	
„ interwoven	XIII.	57 *a.* 1.	25 0	2 10 0
Designs (patterns for embroidery) on paper	XXI.	79 *b.*	Free.	
Diamonds. (*See* Precious Stones.)				
Dice	-	-	According to nature of material.	
Dissolving views	XIX.	73 *b.*	Free.	
Doeskins, according to quality (for particulars, *see* Tariff, Group V.)	XIII.	54.	According to quality.	
Dogs	IV.	16 *c.*	Free.	
„ hair, raw	V.	18 *b.*	Free.	
„ skins „	„	17 *a.*	Free.	
Dolls (puppets). *See* Children's Playthings.				
„ bodies of, without a head, but with arms and feet, of leather	XV.	62 *c.*	6 0	0 12 0
„ „ without a head, of lacquered wood	XVI.	64 *d.* 2.	6 0	0 12 0
„ heads of, according to the nature of the material				
Domestic utensils, wooden, painted, not upholstered	„	64 *c.*	1 50	0 3 0
„ „ upholstered	„	64 *d.* 2.	6 0	0 12 0
Dominoes, of bone, ivory, &c.	„	63 { *b.* 1.	15 0	1 10 0
		b. 2.	6 0	0 12 0
Door fittings, iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ „ „ varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ „ lacquered, polished	„	69 *c.* 2.	6 0	0 12 0
„ „ other kinds	-	-	According to nature of material.	
„ stanchions (uprights), of stone, unground	VIII.	32 *a.* 1.	Free.	
„ „ of stone, ground, polished	XVI.	66 *b.* 2.	6 0	0 12 0
Drainage pipes, of clay	VIII.	32 *a.*	Free.	
Drawings on paper (not increased in number by means of engravings or printing)	XXI.	79 *c.*	Free.	

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Dress, articles of. *See* Clothing.				
Drums	XIX.	73 *a.*	1 0	0 2 0
Dung, animal	XXII.	80 *b.*	Free.	
„ artificial	XX.	76 *d.* 1.	5 0	0 10 0
„ forks, of iron	XVII.	69 *a.* 3.	2 0	0 4 0
Dutch *tiles,* of common clay, with or without glazing	XVI.	67 *a.* 1.	0 25	0 0 6
„ „ pink	„	67 *b.*	2 50	0 5 0
„ clocks (wooden, pendulous)	„	64 *d.* 2.	6 0	0 12 0
Dynamite	XX.	76 *d.* 1.	5 0	0 10 0
Dynamometers	XIX.	73 *b.*	Free.	
E.				
Earrings. *See* Gentlemen and Ladies' Ornaments.				
Earth, all sorts of, not otherwise specified, neither powdered nor washed	VIII.	32 *a.*	Free.	
„ for manufacturing earthenware and porcelain, and colouring earth	„	32 *b.*	Free.	
„ Japanese	IX.	34 *a.*	Free.	
„ resin (bituminous asphalte)	IX.	35 *a.*	Free.	
Earthenware goods. *See* Clay wares.				
Eau de Cologne, according to the receptacles in which it is contained	„	33 *b.* 2.	5 0	0 10 0
	XX.	76 *c.* 2.	12 0	1 4 0
Eels, preserved in oil (in barrels)	VII.	28 *e.* 2.	7 50	0 15 0
Effervescent powder	XX.	76 *a.*	15 0	1 10 0
Eggs, all kinds of (also spawn and eggs of insects), &c.	V.	21 *a.*	Free.	
Eider-down	„	18 *d.*	Free.	
Electric machines	XIX.	73 *b.*	Free.	
Electro-magnetic clocks, with complete movement (like watches)	„	75 *c.* 2.	25 0	2 10 0
Electuary	XX.	76 *a.*	15 0	1 10 0
Elk skins, raw	V.	17 *a.*	Free.	
Embroidery on cotton materials	XIII.	52 *d.*	60 0	6 0 0
„ on linen „	„	53 *g.*	70 0	7 0 0
„ on woollen „	„	54 *f.*	60 0	6 0 0
„ on silk „	„	55 *a.*	80 0	8 0 0
„ on other „	XIX.	75 *b.* 2.	50 0	5 0 0
„ patterns (drawings on paper)	XXI.	79 *b.*	Free.	
„ paper (perforated)	XIV.	60 *d.* 1.	6 0	0 12 0
Emeralds. *See* Precious Stones.				
Enamel, in sticks	XVI.	65 *c.* 4.	0 75	0 1 6
			Or 10 per cent ad valorem.	
„ coloured (*i.e.* glassy flux)	XX.	76 *d.* 1.	5 0	0 10 0
„ wares. *See* Glass wares.				
Envelopes, of paper, lined with calico	XIV.	60 *g.* 2.	6 0	0 12 0
Epsom Salt	XX.	76 *d.* 1.	5 0	0 10 0
Eschalots	III.	9	Free.	

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	Class.	Section.	Austrian Currency.	English Currency.
			fl. kr.	£ s. d.
Essences, for medical purposes	III.	76 *a.*	15 0	1 10 0
„ scented	„	76 *c.* 1.	15 0	1 10 0
Ether, all kinds of	„	76 *d.* 1.	5 0	0 10 0
Ethereal oils. *See* Oils.				
Explosive substances, not otherwise specified. *See* Preliminary Remarks to Tariff.				
Extracts, for pharmaceutical purposes	XX.	76 *a.*	15 0	1 10 0
„ of dye-wood, tanning stuffs, &c.	IX.	34 *g.*	1 50	0 3 0
„ of scented flowers, fruits, oils, or spices, produced by means of spirits of wine, in vessels holding more than quarter Vienna quart	„	33 *b.* 2.	5 0	0 10 0
„ *ditto, less* than quarter ditto	XX.	76 *c.* 2.	12 0	1 4 0
Eyes, artificial, of glass	XVI.	65 *d.* 1.	6 0	0 12 0
			Or 10 per cent. ad valorem.	
Eye-glasses, not framed	„	65 c. 1.	4 0	0 8 0
	—		Or 10 per cent. ad valorem.	
„ in frame, either entirely or *partly* made of precious metals	XIX.	75 *b.* 1.	75 0	7 10 0
„ other kinds	„	75 *c.* 2.	25 0	2 10 0
F.				
Fancy goods			According to quality.	
(for particulars, *see* Tariff, Group X. *b.*)	XIX.	75	According to quality.	
Fans, of palm leaves and cane	XIV.	59 *c.* 1.	2 50	0 5 0
„ of wood	XVI.	64 *d.* 2.	6 0	0 12 0
„ of woven textures, combined with other materials	XIX.	75 *b.* 2.	50 0	5 0 0
Fascines	VIII.	29 *a.*	Free.	
Feather beds (stuffed)	—	—	—	—
NOTE.—Filled feather beds are charged two-thirds of the weight as feathers, and one-third according to the stuff of which the cover is made.				
Feathers, not otherwise specified	V.	18 *d.*	Free.	
„ for beds	„	„	Free.	
Felt (roofing, soaked in tar)	XIII.	54 *a.*	4 50	0 9 0
„ soles for boots and shoes, also if lacquered on one side	„	„	4 50	0 9 0
„ lacquered, tarred, but not printed				
„ „ „ printed	„	54 *d.*	35 0	3 10 0
„ wools for paper manufacture and endless felt	„	54 *a.*	4 50	0 9 0
„ hats, lacquered	„	57 *a.*	25 0	2 10 0
„ „ of common sheep's wool	„	57 *a.* 1.	25 0	2 10 0
„ „ other kinds	„	57 *a.* 2.	45 0	4 10 0
„ *caps, of common sheep's wool*	„	54 *a.*	4 50	0 9 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Felt boots, unconnected with other materials	XIII.	54 *b.* 1.	15 0	1 10 0
„ „ in combination with leather, india-rubber, or leather cloth	XV.	62 *d.* 4.	6 0	0 12 0
Feltwares, unprinted	XIII.	54 *b.* 1.	15 0	1 10 0
„ printed	„	54 *a.*	4 50	0 9 0
Figs, fresh	I.	5 *c.* 1.	0 80	0 1 7½
„ dried	„	5 *b.* 2.	2 50	0 5 0
Figures of stearin, or stearin mixed with gypsum	XX.	77 *b.*	5 25	0 10 6
Files, of iron without regard to their length	XVII.	69 *b.* 1.	4 0	0 8 0
„ artificial (mineral or emery files), for filing metal wares	VIII.	32 *c.* 2 *a.*	0 75	0 1 6
„ artificial (leather files of wood and common leather) for polishing metal	XVI.	64 *c.* 1.	1 50	0 3 0
File-steel, raw, wrought in the form of files	X.	40 *d.* 1.	1 25	0 2 6
„ finished but not grooved	„	40 *f.* 3.	1 75	0 3 6
Filter balls of charcoal	XX.	76 *d.* 1.	5 0	0 10 0
Filtering paper	XIV.	60 *b.* 1.	1 50	0 3 0
„ cloth	XIII.	54 *a.*	4 50	0 9 0
Fir (bark of fir tree)	IX.	34 *b.*	Free.	
Fire buckets	„	53 *a.*	0 75	0 1 6
	„	53 *c.* 1.	6 0	0 12 0
„ **engines** (like machines). *See* Tariff, Group XIII.	XIX.	74	According to nature of material.	
„ tongs	XVII.	69 *a.* 3.	2 0	0 4 0
„ wood, not above 42 Vienna inches long	VIII.	29 *a.*	Free.	
Fish, fresh	IV.	14 *a.*	Free.	
„ not otherwise specified (salt, dried, smoked, pickled)	„	14 *d.*	1 50	0 3 0
„ otherwise prepared (also Caviar)	VII.	28 *e.* 1.	10 0	1 0 0
„ spawn (for the artificial rearing of fish)	IV.	14 *c.*	0 75	0 1 6
„ scales	V.	21 *b.* 1.	0 80	0 1 7½
Fishing nets, old	XXII.	80 *c.*	Free.	
„ „ of cotton, coarse	XIII.	52 *a.* ?	12 0	1 4 0
„ „ hemp or flax, unbleached	„	53 *a.*	0 75	0 1 6
„ „ „ bleached and dyed	„	53 *d.* 3.	6 0	0 12 0
„ „ of jute, bleached	„	53 *d.* 4.	3 0	0 6 0
„ hooks of iron	XVII.	69 *c.* 2.	6 0	0 12 0
Flags, without staffs. (For particulars, *see* Tariff, Group V.)	XIII.	57	According to quality.	
„ with staffs	XIX.	75 *b.*	75 0	7 10 0
Flannel, not printed	XIII.	54 *c.* 1.	35 0	3 10 0
„ printed	„	54 *d.*	35 0	3 10 0
Flax, in stalks and bundles	III.	13 *c.*	Free.	
„ scutched or hatchelled (also codilla)	XI.	46	Free.	
„ cotton (chemically prepared flax)				
„ earth-flax (at best)	VIII.	32 *a.* i.	Free.	
Flintstones	„	32 *c.* 2 *a.*	0 75	0 1 6
Flockwool	XI.	47 *a.*	Free.	
Floss silk, not dyed	„	48 *e.*	6 0	0 12 0
„ dyed	„	48 *f.*	6 0	0 12 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Flowers, and parts of, fresh	III.	13 *e.*	Free.	
,, ,, dried	,,	13 *h.* 1.	0 80	0 1 7½
,, artificial, of woven textures	XIII.	57 *c.* 1.	85 0	8 10 0
,, ,, of dyed cotton thread, cardboard, and iron wire	XIV.	60 *g.* 2.	6 0	0 12 0
,, of plaited straw, according to quality	,,	59	According to quality.	
,, of hair	XIX.	75 *b.* 1.	75 0	7 10 0
,, of wax	,,	75 *c.* 2.	25 0	2 10 0
,, of bulbs	III.	13 *h.* 1.	0 80	0 1 7½
Fly paper	XIV.	60 *c.*	1 50	0 3 0
Foils, of gold and silver (genuine gold and silver leaf)	XIX.	75 *b.* 1.	75 0	7 10 0
of tin	XVII.	70 *c.* 2.	6 0	0 12 0
of lead	X.	39 *b.* 2.	2 50	0 5 0
,, ,, varnished, painted, lacquered	XVII.	68. 2.	6 0	0 12 0
Forks (dung, hay, and stove forks), of iron, &c.	,,	69 *a.* 3.	2 0	0 4 0
	,,	69 *c.* 3.	4 0	0 8 0
	,,	69 *c.* 2.	6 0	0 12 0
,, gilt or silver plated	XIX.	75 *a.*	75 0	7 10 0
,, with gilt or silver-plated handles	,,	75 *b.* 1.	75 0	7 10 0
,, with handles of purely gilt or silver-plated common metals	,,	75 *b.* 3.	25 0	2 10 0
,, with handles of tortoiseshell	,,	75 *c.* 1.	50 0	5 0 0
Foulards, silk	XIII.	55 *a.*	80 0	8 0 0
Frankfort black	XX.	76 *b.* 1.	0 75	0 1 6
French brandy	VII.	26 *a.* 1.	9 0	0 18 0
Fringes, of cotton	XIII.	52 *b.* 3.	30 0	3 0 0
,, of wool	,,	54 *c.* 2.	35 0	3 10 0
,, of silk	,,	55 *a.*	80 0	8 0 0
		55 *b.*	60 0	6 0 0
,, stitched	,,	57 *a.* 1.	25 0	2 10 0
		57 *a.* 2.	45 0	4 10 0
		57 *b.*	65 0	6 10 0
		57 *c.* 1.	85 0	8 10 0
		57 *c.* 2.	65 0	6 10 0
Fruit, fresh	III.	9 *a.*	Free.	
,, dried	,,	9 *b.* 2.	0 80	0 1 7½
,, preserved in sugar, honey, oil, or otherwise	VII.	28 *e.* 1.	10 0	1 0 0
,, artificial, of woven textures	XIII.	57 *c.* 1.	85 0	8 10 0
,, ,, of wax	XIX.	75 *c.* 2.	25 0	2 10 0
,, not otherwise specified	III.	13 *h.* 1.	0 80	0 1 7½
Fungi, eatable, fresh	,,	9 *a.*	Free.	
,, ,, dried, parched, pickled in vinegar in barrels	,,	9 *b.* 1.	Free.	
,, otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
G.				
Gall-nuts	IX.	34	Free.	
,, extract	,,	34 *g.*	1 50	0 3 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Gamboge	IX.	35 *d.* 2.	0 80	0 1 7½
Game, large, also alive, viz., reindeer, deer, wild boars, and chamois	IV.	16 *a.*	1 58	0 3 2
Garden implements of wood	XVI.	64 *a.*	Free.	
Garlic	III.	9 *a.*	Free.	
Garments	XIII.	57 *a.*	25 0	2 10 0
		1, 2 *b.*	45 0	4 10 0
		c. 1 & 2.	65 0	6 10 0
		—	85 0	8 10 0
Garnets. *See* Precious stones.				
„ blocks, rough	VIII.	32 *a.* 1.	Free.	
Garters	—	—	According to quality of material.	
Gas-burners, iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ coal (cokes)	XIX.	73 *b.*	Free.	
Gasometers for scientific purposes	„	„	Free.	
„ for the control of the consumption (gas-meters)	„	„	Free.	
Gauze, of cotton	XIII.	52 *c.*	45 0	4 10 0
„ of linen	„	53 *f.*	60 0	6 0 0
„ of pure silk	„	55 *a.* 1.	80 0	8 0 0
„ half silk, half cotton	„	55 *b.* 2.	60 0	6 0 0
Geese	IV.	16 *c.*	Free.	
Gelatine	XX.	76 *b.* 1.	0 75	0 1 6
Gentlemen and Ladies' Ornaments made of iron	XVII.	69 *c.* 2.	6 0	0 12 0
„ „ „ of other base metals	„	70 *c.* 2.	6 0	0 12 0
„ „ „ fine work, not burnished with alabaster, ivory, enamel, paste, &c., &c.	„	70 *c.* 1.	15 0	1 10 0
„ „ „ burnished (imitation gilt or plated)	XIX.	75 *c.* 2.	25 0	2 10 0
„ „ „ real gilt or plated	„	75 *b.* 1.	75 0	7 10 0
„ „ „ of gold or silver	„	75 *a.*	75 0	7 10 0
NOTE.—Goods are only considered as being gentlemen and ladies' ornaments, when they can be worn as they are.				
Gilding-glue	XX.	76 *b.* 1.	0 75	0 1 6
Ginger	I.	3 *a.*	8 0	0 16 0
„ **bread**	VII.	28 *e.* 1.	10 0	1 0 0
Girdles, cotton unbleached, bleached, coloured	XIII.	52 *a.* 2.	12 0	1 4 0
„ linen, unbleached	„	53 *a.*	0 75	0 1 6
„ „ bleached	„	53 *b.*	0 75	0 1 6
„ woollen, not coloured, and coloured	„	54 *b.* 2.	4 50	0 9 0
„ silk	„	55	60 0	6 0 0
Glass (*i.e.*, concave glass, glass ware), green, black, yellow	XVI.	65 *a.* 1.	0 75	0 1 6
„ plate glass, raw, uncut, also enamel	„	65 *a.* 2.	0 75	0 1 6

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Glass, plate, in its natural colour, green, semi and entirely white, also assorted, scaled	XVI.	65 *b.*	1 0	0 2 0
„ white, unfigured, not cut	„	„	1 0	0 2 0
„ (window and plate glass) in its natural colour (green, partly, and all white)	„	„	1 0	0 2 0
„ whole, pressed, cut, figured	„	65 *c.* 1.	4 0	0 8 0
„ concave (hollow) white for lamps made untransparent, without ornaments	„	65 *c.* 3.	1 0	0 2 0
„ with ornaments	„	65 *d.* 1.	6 0	0 12 0
„ and enamel in sticks	„	65 *c.* 4.	0 75	0 1 6
„ coloured, painted, gilt, silvered with cameos	„	65 *d.* 1.	6 0	0 12 0
„ pendants for chandeliers (also coloured)	„	65 *c.* 2.	1 0	0 2 0
„ flux. *See* Paste	„	65 *d.* 1.	6 0	0 12 0
„ buttons (also coloured)	„	65 *c.* 2.	1 0	0 2 0
„ corals of white glass	„	„	1 0	0 2 0
Glass corals, coloured	XVI.	65 *d.* 2.	1 0	0 2 0
„ paper	VIII.	32 *c.* 2.	0 75	0 1 6
„ pearls (also coloured)	XVI.	65 *c.* 2.	1 0	0 2 0
„ plates and sticks, for making pearls, buttons, &c. without distinction as to colour	„	65 *c.* 4.	0 75	0 1 6
„ drops (Prince Rupert's drops) coloured or uncoloured	„	65 *c.* 2.	1 0	0 2 0
„ wares in combinations which do not come under small or fancy wares	„	65 *d.* 1.	6 0	0 12 0
Globes (geographical)	XIX.	73 *b.*	Free.	
„ (also shades and shells) white, non-transparent and without adornment, and others	-	-	According to nature of material.	
Gloves, cotton (Knitted, worked)	XIII.	52 *b.* 3.	30 0	3 0 0
„ woollen (Knitted, worked)	„	54 *c.* 2.	35 0	3 10 0
„ silk (Knitted, worked)	„	55 *b.* 3.	60 0	6 0 0
„ ready cut out, sewn (Knitted, worked)	„	57	60 0	6 0 0
„ made of fur	XV.	61 *b.*	50 0	5 0 0
„ made of leather as well as only ready cut out, or combined with textile or woven goods	„	62 *e.*	20 0	2 0 0
„ leather. *See* leather.				
„ maker's goods	„	62	7 50	0 15 0
Glue, marine (ship tar, with oil and india-rubber)	XX.	76 *a.* 1.	5 0	0 10 0
Glycerine (sugar of oil), residue in the process of manufacturing stearine candles	VI.	22 *d.* 1.	1 50	0 3 0
Goat skins, common, rough (also buck and kid skins), also half-tanned (tanned, not coloured and not further prepared)	V.	17	Free.	
„ hair, raw	„	„	Free.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Gold, raw, in lumps, bars, plates, pieces, dust, melted together. (Bars mixed with copper), also old, broken, or burnt	X.	44 *a.*	Free.	
„ plates and foil	XIX.	75 *b.* 1.	75 0	7 10 0
„ spinnings, genuine	„	75 *a.* 2.	75 0	7 10 0
„ products thereof	„	„	75 0	7 10 0
Gold lacquer	XX.	76 *d.* 1.	5 0	0 10 0
NOTE.—By the term used in the tariff, covered with "lacquer containing gold or silver," the covering with a lacquer containing real gold or silver (pulverised metal) is always to be understood; whereas, the covering with other than that containing gold or silver, *i.e.*, the lacquers which are only an imitation of the gilding or silvering (by which are understood those spirituous or oily varnishes and lacquers which are coloured yellow or white by means of organic substances, and are laid on metal wares and give them the appearance of being gilded or silvered), brings the article under the category of ordinary lacquered goods.				
The former, the varnish containing gold or silver, conceals the material covered with it completely, whilst the latter is, as a rule, transparent or translucent. By means of a magnifying glass the metallic powder mixed up with it will at once be recognisable.				
„ paper	XIV.	60 *d.* 1.	6 0	0 12 0
„ „ work made therefrom	XIX.	75 *c.* 2.	25 0	2 10 0
„ edge (of paper)	XIV.	60 *d.* 1.	6 0	0 12 0
„ sulphuret (sulphuret of antimony)	XX.	76 *d.* 1.	5 0	0 10 0
„ and silver stuffs, made of gold or silver spinnings, like textures with metallic threads	XIII.	54 *f.*	60 0	6 0 0
„ pieces of ore	X.	38 *b.*	Free.	
Goldbeaters' skin	V.	21 *b.* 2.	0 75	0 1 6
Goldsmiths' wares, also including precious stones, semi-precious stones, genuine and imitation pearls, corals, imitation stones (paste), amber, jet, tortoiseshell, human hair, textures, and woven goods	XIX.	75 *a.*	75 0	7 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Goldsmiths' wares, entirely or partially made of gold, genuine or imitation pearls, genuine or imitation corals, precious stones	XIX.	75 *b.* 1.	75 0	7 10 0
„ „ duty free. *See* preface to the Customs' Tariff.				
Goods, made of serpentine stone and having no connexion with other materials, ditto in connexion with other materials, but not coming under the category of small wares and fancy goods	XVI.	66 *c.*	6 0	0 12 0
„ (fancy), of gold and silver	XIX.	75 *b.* 1.	75 0	7 10 0
„ (fancy), real gold or silver, plated	„	„	75 0	7 10 0
„ „ burnished (imitation gold or silver-plated)	„	75 *c.* 2.	25 0	2 10 0
„ „ made of base metals, fine worked, unburnished, in connexion with alabaster, ivory, enamel, paste, and such like	XVII.	70 *c.* 1.	15 0	1 10 0
Goose grease	VI.	22 *a.* 1.	2 63	0 5 3½
Gooseberries, fresh			Free.	
„ without sugar	III.	9 *b.* 2.	0 80	0 1 7½
„ boiled	„	„	0 80	0 1 7½
„ otherwise prepared	VII.	28 *c.* 1.	10 0	1 0 0
Grape-sugar (glucose)	I.	7 *b.*	9 45	0 18 11
Grapes, fresh	VII.	27	4 0	0 8 0
„ dried	I.	5 *a.* 2.	2 50	0 5 0
Graphite (black-lead ore)	VIII.	32 *b.*	Free.	
„ utensils	XVI.	67 *a.*	0 25	0 0 6
Grass, ordinary	III.	13 *c.*	Free.	
„ Chinese, Mexican, Indian	XI.	46	Free.	
„ Brazilian, red, appears to be coloured	III.	13 *c.*	Free.	
„ coloured	„	13 *h.* 1.	0 80	0 1 7½
„ artificial, made of feathers	XIII.	57 *c.* 1.	85 0	8 10 0
„ plaitings	XIV.	59	0 25	0 0 6
„ seed (hay seed)	III.	13 *c.*	Free.	
„ wares, for domestic use	XIV.	59 *c.* 1.	2 50	0 5 0
Grates, cast-iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ wrought-iron	XVII.	69 *a.* 3.	2 0	0 4 0
Gravestones	XVI.	66 *b.* 2.	0 75	0 1 6
Grease, not particularly mentioned	VI.	22 *d.* 1.	0 80	0 1 7½
„ perfumed	IX.	33 *b.* 2.	5 0	0 10 0
„ manufactures from, not particularly denoted	XX.	77 *b.*	5 25	0 10 6
Grinding-stones, rough	VIII.	32 *a.* 1.	Free.	
„ fine (also connected with grinding-stones of a composition, &c. ground out with tar, and connected with oil in tobacco-pipes (Nicotine)			Free.	

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Grinding stones, to grind metal goods -	VIII.	32 *c.* 2.	0 75	0 1 6
„ with or without connexion with other goods -	XVI.	66 *c.*	6 0	0 12 0
Gros-grain (silk) - - - - -	XIII.	55 *a.*	80 0	8 0 0
„ **de Naples,** and **de Tours** - -	„	„	80 0	8 0 0
Guano (all kinds) - - - - -	XXII.	80 *b.*	Free.	
Gum, not specified - - - - -	IX.	35 *d.* 2.	0 80	0 1 7½
NOTE.—Under this head belong:—Acarna gum, Aloe, Alonichi resin, Arnia resin, Anime (fluid resin), gum arabic, Bdellium (Malathran) gum, raw camphor, Dammar resin, Elemi resin, olive-tree resin, ivy resin (gummi hederæ), Euphorbia resin, Sarcocolla resin, Gambia gum (Kino), Gedda gum (an Arabian gum), Cherry-tree gum, Ladanum gum, mummy, in pieces or dust, Opoponax gum, Sandarac resin, Senegal gum (Arabian), shellac, stick lac, sealing-wax in sticks, shell-lac, as well as white-bleached gum tragacanth.				
„ (elastic) *see* India-rubber.				
„ **threads,** without connexion with other materials - - -	XV.	62 *a.* 1.	5 50	0 11 0
„ „ gimped - - -	„	62 *b.* 2.	6 0	0 12 0
„ **resins,** not specified - - -	IX.	35 *d.* 2.	Free.	
„ **lac** - - - - -	„	„	Free.	
„ **cakes** (plates) raw, uncleansed -	„	35 *d.* 1.	Free.	
„ „ cleansed, also horned and smoothened (by dipping the liquid india-rubber into liquid sulphur (ebonite), or by impressing it with a manufacturing and similar stamp -	XV.	62 *a.* 2.	0 75	0 1 6
„ **substitutes** - - - - -	XX.	76 *b.*	0 75	0 1 6
All these goods, inclusive of materials, not coming under the category of hardwares: **Gum-wares** of unlacquered, uncoloured, unprinted, india-rubber, or gutta-percha -	XV.	62 *c.*	6 0	0 12 0
„ of leather cloth, fine oil-cloth, oiled silk, oil skin - -	„	62 *d.* 3.	10 50	1 1 0
„ of lacquered, coloured, printed india-rubber or gutta-percha -	„	„	15 0	1 10 0
„ of coarse, unprinted, oil-cloth - -	„	62 *d.* 4.	6 0	0 12 0
Note.—India-rubber is only treated as coloured or lacquered, which has colour and lacquer laid on upon its upper surface, but not the vulcanized, polished, or other descriptions coloured in the substance.				

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			fl. kr.	£ s. d.
Guns (fire-arms), of all descriptions -	XVII.	69 *c.* 1.	15 0	1 10 0
Gun-barrels, of iron - - -	„	69 *c.* 2.	6 0	0 12 0
„ **wads** (stoppers made of cows' hair), covered over on both sides with paper (including also glued empty cartridge cases) -	XIV.	60 *g.* 2.	6 0	0 12 0
„ **cotton.** *See* Notice in preface to Customs' Tariff.				
„ **powder.** *See* Preface to Customs' Tariff.				
Gutta-percha, raw, uncleansed - -	IX.	35 *d.* 1.	Free.	
„ cleansed - - -	XV.	62 *a.* 2.	0 75	0 1 6
„ paper, covered with a solution of gutta-percha -	XIV.	60 *c.*	1 50	0 3 0
„ goods. *See* Gum wares.				
Gutters, wooden - - - -	XVI.	64 *a.*	Free.	
„ made of uncut stone - -	„	„	Free.	
Gypsum, burnt and unburnt - -	VIII.	32 *a.* 1.	Free.	
„ ground - - - -	„	„	Free.	
H.				
Hair, not specified (including human hair), raw - - - - -	V.	18 *a.*	Free.	
„ boiled down, combed, dyed, steeped -	„	18 *c.*	Free.	
„ false (African, made of palm leaves as a substitute for horse-hair), dyed	III.	13 *h.* 1.	0 80	0 1 7½
„ dyes - - - - -	XX.	76 *a.*	0 15	0 0 3⅗
„ plaitings and braids made of human hair - - - - -	XIX.	75 *b.* 1.	75 0	7 10 0
„ brushes (for painting purposes) -	XIV.	58 *b.* 1.	6 0	0 12 0
„ powder - - - - -	XX.	76 *b.* 1.	0 75	0 1 6
„ sieves, made of horse-hair or other animal hair, without admixture of other materials -	XIII.	54 *a.*	4 50	0 9 0
„ „ ready made - - -	XIV.	58 *b.* 1.	6 0	0 12 0
„ *soles.* *See* Felts.				
„ human - - - - -	V.	18	Free.	
„ „ its products - - -	XIX.	75 *b.* 1.	75 0	7 10 0
Hammers, iron - - - -	-	-	According to quality of material.	
„ wooden - - - -				
„ others - - - -				
Hammocks, made of Manilla hemp, knitted like nets, bleached, coloured	XIII.	53 *d.* 3.	6 0	0 12 0
„ unbleached, uncoloured -	„	53 *c.* 1.	6 0	0 12 0
Hampers (portable baskets), rough -	XVI.	64 *a.*	Free.	
Hams - - - - -	V.	52 *a.* 1, 2.	16 0	1 12 0
Hand spinnings, linen, rough - -	XII.	50 *a.* 2.	Free.	
„ **sleighs,** wooden - - -	XVI.	64 *a.*	Free.	
Handkerchiefs, including those with plain seam, plain hem, fringes, sewn on, names worked in - cotton	XIII.	52 *a.* 1.	16 0	1 12 0
linen -	„	53 *a.*	0 75	0 1 6
silk	„	54 *f.*	60 0	6 0 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Handkerchiefs, artificially sewn or trimmed with lace	XIII.	57 *c.* 1.	85 0	8 10 0
Hares (also skinned)	IV.	16 *c.*	Free.	
„ skins, raw	V.	17 *a.*	Free.	
Harmonica (musical glasses), large	XIX.	73 *a.*	3 0	0 6 0
„ as playthings, according to the quality of the material				
Harness. *See* Saddlers' wares.				
Harrow, iron	XVII.	69 *a.*	4 0	0 8 0
„ wooden	XVI.	64 *a.*	Free.	
Hat-blocks, wooden	XVI.	64 *a.*	Free.	
Hat cover bodies (for lining for ladies' hats), of chip, with cotton gauze glued on	XIII.	57 *b.*	60 0	6 0 0
„ **grease-bands,** leather, not stitched or sewn	XV.	62 *b.* 1.	7 50	0 15 0
„ stiched, sewn	„	62 *d.* 3.	10 50	1 1 0
Hats of oil-cloth	XIII.	56 *b.* 2.	5 0	0 10 0
„ parts of, ready-made, of straw, chip, and paper hats. *See* trimmed hats.				
„ untrimmed, made of straw, chip, and palm leaves	XIV.	59 *f.* 2.	0 10	0 0 2½
„ „ of reed or rush	„	59 *d.* 3.	0 10	0 0 2½
„ „ of wood shavings	„	59 *d.* 2.	1 0	0 2 0
„ „ of felt	XIII.	57 *a.* 2.	45 0	4 10 0
„ „ of fine woollen material, Gibus hats, *i.e.*, opera hats	„	57 *b.*	60 0	6 0 0
„ „ of whalebone	XVI.	63 *b.* 3.	0 10	0 0 2½
„ „ of hair and hair plaitings, of esparto grass, as well as of plaitings of so-called cotton esparto and straw	XIV.	59 *f.* 2.	0 10	0 0 2½
„ trimmed, of straw, chip, reed, rush, whalebone, palm leaves, shavings	XIII.	57 *c.* 3.	0 20	0 0 5
„ „ of cloth stuffs	„	57 *b.*	60 0	6 0 0
„ crowns, made of wood shavings	XIV.	58 *a.*	1 0	0 2 0
„ „ cotton	XIII.	57 *a.* 1.	25 0	2 10 0
„ „ in stripes and lengths, of paper and silk gauze	XIX.	75 *b.* 1.	75 0	7 10 0
„ „ of silk gauze, with interlinings of india-rubber or gutta-percha, with other textile goods	XIII.	56 *c.* 1.	22 50	2 5 0
Hatchets, iron	XVII.	69 *b.* 1.	4 0	0 8 0
„ brass	„	69 *c.* 3.	4 0	0 8 0
Hay	III.	13 *c.*	Free.	
„ forks (pitchforks), iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ seed	III.	13 *c.*	Free.	
Hazel-nuts	„	9 *b.* 2.	Free.	
Hearing instruments (speaking trumpets)	XIX.	73 *b.*	Free.	
Heather	III.	10 *b.*	Free.	
„ corn	„	„	Free.	
„ herbs (trebbia), including roots	„	13 *c.*	Free.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Heavy spar. *See* Baryte.				
Hedgehogs	IV.	16	Free.	
Hemp, water-retted or not water-retted, in stalks and bundles (also without bark)	„	„	Free.	
„ broken and combed (also tow and oakum)	XI.	46	Free.	
„ oil	VI.	23 *d.*	0 75	0 1 6
„ seeds	III.	13 *e.* 2.	Free.	
Hens	IV.	16 *c.*	Free.	
Herbages (for fodder)	III.	13 *c.*	Free.	
„ other kinds, dried	„	13 *h.* 1.	0 80	0 1 7½
Herb tea	„	„	0 80	0 1 7½
Herbarium (dried plants for scientific purposes)	„	„	0 80	0 1 7½
Hereditary effects. *See* Preface to Customs' Tariff.				
Herons' feathers, raw	V.	18 *d.*	Free.	
„ „ prepared	„	18 *e.*	Free.	
Herrings, salted, per ton	IV.	14 *b.* 1.	50 0	5 0 0
„ smoked (cured)	„	14 *b.* 2.	0 50	0 1 0
Hides (skins), common, raw	V.	17 *a.*	Free.	
„ not specified, raw	„	17 *b.*	Free.	
Hippopotamus hides, raw	„	17 *a.*	Free.	
Hoes, of iron	XVII.	69 *b.* 1.	4 0	0 8 0
Honey	V.	20 *a.*	0 75	0 1 6
„ for medicinal purposes	XX.	76 *a.*	15 0	1 10 0
Hoods (coifs), made of real gold and silver spinnings	XIX.	75 *a.* 2.	75 0	7 10 0
„ others. *See* Clothing.				
„ stocks for, *i.e.*, coif stocks or milliners' stocks, wooden	XVI.	64 *a.*	Free.	
„ others	- -	- -	According to quality of material.	
Hooks, iron	XVII.	69 *b.* 1.	4 0	0 8 0
Hoops, wooden	XVI.	64 *a.*	Free.	
„ others	- -	- -	According to quality of material.	
Hops	III.	13 *a.*	2 50	0 5 0
Horn tips, raw	VIII.	31 *a.* 1.	Free.	
„ plates (flat strips)	„	„	Free.	
„ „ pressed or polished	XVI.	63 *b.* 2.	6 0	0 12 0
Horns, rasped, powdered	V.	18 *d.*	Free.	
Horned cattle, per head	IV.	15	4 20	0 8 5
Horse brushes (also combined with textile goods)	XIV.	58 *b.* 1.	6 0	0 12 0
„ **harness.** *See* Saddlery.				
Horse chestnuts	III.	13 *c.*	Free.	
„ „ husks of	IX.	34 *b.*	Free.	
Horsehair	V.	18	Free.	
„ plaitings, common	XIII.	54 *a.*	4 50	0 9 0
„ „ fine	XIII.	54 *b.* 1.	15 0	1 10 0
„ „ raw	V.	18 *a.*	Free.	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Horsehair, plaited, rough	XIII.	54 *a.*	4 50	0 9 0
„ „ fine	„	54 *c.* 2.	35 0	3 10 0
„ twisted, boiled, coloured	V.	18 *c.*	Free.	
Horse hides, raw	„	17 *a.*	Free.	
„ **nets**, cotton	XIII.	52 *a.* 2.	12 0	1 4 0
„ „ linen, unbleached	„	53 *a.*	0 75	0 1 6
„ „ bleached, coloured	„	53 *d.* 3.	6 0	0 12 0
„ „ made of jute, coloured	„	53 *d.* 4.	3 0	0 6 0
„ **shoes**	XVII.	69 *a.* 3.	4 0	0 8 0
„ **sponges**	IX.	33 *b.* 1.	0 75	0 1 6
„ „ wastes	V.	21 *b.* 1.	0 80	0 1 7
„ **tail**, or Dutch rush	III.	13 *c.*	Free.	
„ **tails** (plumes, toppings, made of horse-hair wound or plaited one over the other, and finished off)	XIII.	54 *a.*	2 10	0 9 0
Horses	IV.	15 *h.*	4 50	0 4 2
Huckaback, raw, unbleached, unassorted, of flax or hemp	XIII.	53 *c.* 1.	6 0	0 12 0
„ of jute only	„	53 *c.* 2.	3 0	0 6 0
„ rough, not bleached and not assorted	„	52 *a.* 1, 2.	16 0	1 12 0
„ made of flax or hemp	„	53 *c.* 1.	6 0	0 12 0
„ made of jute	„	53 *c.* 2.	3 0	0 6 0
„ made of linen, dressed, bleached, coloured, also assorted or printed, up to 100 chain threads to the Viennese current inch	„	53 *d.* 1.	20 0	2 0 0
„ made of linen, dressed, bleached, coloured, also assorted or printed, up to 50 chain threads to the Viennese current inch	„	53 *d.* 2.	10 0	1 0 0
Hunting-bags, made of woven or textile stuffs	XV.	62 *d.* 3.	10 50	1 1 0
„ other kinds. *See* Bags.				
Hydraulic lime	VIII.	32 *a.* 1.	Free.	
Hydrochlorate of soda (common salt, as used for cooking purposes)	IX.	36	0 42	0 0 10½
Hydrochloric acid	XX.	76 *d.* 1.	5 0	0 10 0
Hyraceum (a blackish-brown substance, smelling like beaver's cod, made from the dried urine of the amphibious hyrax [daman])	V.	21 *b.* 1.	Free.	
I.				
Ice	VIII.	32 *a.*	Free.	
Iceland moss	IX.	35 *a.*	0 80	0 1 7½
Images, made of stearine, or of plaster steeped with stearine	XX.	77 *b.*	5 25	0 10 6
„ others	-	-	*According to quality of material.*	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Immortelles, wreaths, chaplets of - -	III.	13 *h.* 1.	0 80	0 1 7½
Impressions and castings in stearine and plaster (gypsum) composite	XX.	77 *b.*	5 25	0 10 6
„ and castings, others - -	- -	- -	According to quality of materials.	
India rubber, raw (in its original shape of bottles and shoes) -	IX.	35 *d.* 1.	Free.	
„ cleansed, in tablets, and in a liquid state - -	XV.	62 *a.* 2.	0 75	0 1 6
„ fabrics - - -	„	62 *c.*	6 0	0 12 0
„ oil - - - -	IX.	33 *a.* 2.	3 0	0 6 0
„ *See* Gum wares.				
„ shoes (goloshes), black patent	XV.	62 *d.* 3.	10 50	1 1 0
Indian berries (grass, similar to the Manilla hemp, and finer than hemp) -	XI.	46	Free.	
„ **inks** - - - - -	XX.	76 *c.* 2.	12 0	1 4 0
Indigo - - - - -	IX.	34 *f.* 1.	0 80	0 1 7½
„ red (Persian) - - -	„	34 *g.*	1 50	0 3 0
„ in tablets - - - -	XX.	76 *d.* 1.	5 0	0 10 0
„ carmine - - - -	„	„	5 0	0 10 0
„ yellow - - - -	„	„	5 0	0 10 0
Inks and ink powders, materials for, according to quality - - - -	„	76 *c.* 4.	5 0	0 10 0
Inlaid Floorings (parquet floorings), modern, not inlaid -	XVI.	64 *b.*	0 75	0 1 6
„ „ inlaid (as well as not inlaid), coloured, stained, pressed, or pasted over with paper - -	„	64 *c.* 1.	1 50	0 3 0
Insects, dried - - - -	IV.	16 *c.*	Free.	
„ powder - - - -	III.	13 *h.* 1.	Free.	
Instruments, musical - - -	XIX.	73 *a.*	3 0	0 6 0
„ not especially named, *i.e.*, astronomical, surgical, mathematical, mechanical, optical, physical, &c. for laboratories, as well as chemical, regardless of the materials of which they are made - - -	XIX.	73 *b.*	Free.	
„ cases of mathematical -	„	„	Free.	
Iodine, and preparations thereof - -	XX.	76 *d.* 1.	5 0	0 10 0
Ipecacuanha - - - -	IX.	33 *a.* 1.	5 25	0 10 6
Iron, raw, also old, scrap - - -	X.	40 *a.* 1.	0 25	0 0 6
„ refined, in rods or bars, unshaped, viz.: Hoop iron in bundles - - flat iron, not over 7 Vienna inches broad - - gall-nut iron - - - crisped iron - - - square iron - - - round iron, over ½ Vienna inch in diameter - - - *rod iron* - - - -	„	40 *b.*	1 25	0 2 6

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Iron, refined, in rods or bars, shaped, viz.: triangular, semicircular, oval iron - - - - angle iron - - - window-bar an stay-bar iron - U T iron - - - - L-shaped bar iron - -	X.	40 *f.* 3.	1 75	0 3 6
„ waste, scrap - - - -	„	40 *a.* 1.	0 25	0 0 6
„ liquor (iron-rust water) - -	IX.	37 *a.*	Free.	
„ leaves, at each long edge furnished with teeth alike on both sides (turnip graters) - - -	XIX.	74 *c.*	2 0	0 4 0
„ sheet, black, also dressed (smoothened but not polished, for making tin plates) - - -	X.	40 *e.* 1.	2 0	0 4 0
„ „ polished, tin-coated (tin-plated), galvanised, varnished, covered with lead - - -	„	40 *f.* 1.	4 0	0 8 0
„ „ coppered, punched - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ wire, unpolished - - -	X.	40 *f.* 2.	2 0	0 4 0
„ „ polished - - - -	„	40 *f.* 1.	4 0	0 8 0
„ „ coppered, tinned, galvanised, covered with lead - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ covered with paper - -	„	69 *c.* 2.	6 0	0 12 0
„ ore (or iron-stone) - - -	X.	38 *a.* 1.	Free.	
„ filings (file dust) - - - -	„	40 *a.*	0 25	0 0 6
„ castings, coarse, rough, *i.e.*, neither partly nor entirely turned, filed, polished off; also black, red, or otherwise coloured, varnished for protection against rust, or with a black covering of asphalte or tar (also when it has received an opening [flaw] in casting), regardless of the weight -	„	40 *i.*	0 60	0 1 2½
„ castings, others, *i.e.*, only to a small extent turned, planed, polished, or painted - - - -	XVII.	69 *a.* 3.	2 0	0 4 0
„ feu - - - - -	IX.	37 *a.*	Free.	
„ plates, of cast iron, coarse - -	X.	40 *i.* 1.	0 60	0 1 2½
„ plates, of wrought iron, rough (unpolished) - - -	„	40 *e.* 1.	2 0	0 4 0
„ „ polished, tinned, galvanised, covered with lead - -	„	40 *f.* 1.	4 0	0 8 0
„ „ coppered - - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ saffron (crocus natirus) - -	IX.	37 *a.*	Free.	
„ rods, round, under ½ Vienna inch in diameter, like iron wire - -				
„ sulphate of, copperas - - -	„	„	Free.	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Iron wares (or goods), neither half nor entirely ground, varnished, polished, lacquered, or enamelled; also coppered, tinned, or scoured (*i.e.*, freed from their rough upper surface by rolling or rubbing with shavings, &c.); also sheet-iron and iron plates coppered, iron wire, coppered, tinned, galvanised, covered with lead - - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ wire tack - - -	„	69 *a.* 2.	3 50	0 7 0
„ „ cast iron, coarse, inasmuch as it is not included under 40*i.*, and other coarse iron-wares -	„	69 *a.* 3.	2 0	0 4 0
„ „ wrought-iron tubes - -	„	69 *a.* 4.	1 25	0 2 6
All the above also in conjunction with wood.				
„ „ hatchets, saws, chisels, planes, clothmakers', stock, sheep, and coarse tailors' shears, coarse knives for mechanical use, gimlets, millers' pick-axes, files, rasps - -	„	69 *b.* 1.	4 0	0 8 0
„ „ wire ropes and brushes, sieve-bottoms of wire gauze, steeple-clocks, and enamelled cooking apparatus -	„	„	4 0	0 8 0
„ „ screws - - - - -	„	69 *b.* 2.	3 50	0 7 0
„ „ scythes, sickles, chopper-blades (chaff-cutters) -	„	69 *b.* 3.	2 0	0 4 0
All these articles also in conjunction with wood.				
„ „ completely edged off, varnished, but neither polished, lacquered, enamelled, also in conjunction with wood -	„	69 *c.* 3.	4 0	0 8 0
„ „ polished, lacquered, enamelled, or in conjunction with other materials not belonging to the hardwares - -	„	69 *c.* 2.	6 0	0 12 0
„ „ ladies' and gentlemen's ornaments, whatnots, and toilet articles, but not imitation-gilt or plated - -	„	„	6 0	0 12 0
„ „ trellis and wicker-work, superior - - - -	„	„	6 0	0 12 0
„ „ fish-hooks, tags, loops, needles, (with the exception of sewing-needles), buckles made of wire, wire covered with paper - -	„	„	6 0	0 12 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Iron wares, jewsharps, thimbles, holders, &c. for writing-pens, steel beads, weavers' combs and tweezers; further, cards of all sorts, upholstery, furniture - - -	XVII.	69 *c.* 2.	6 0	0 12 0
„ „ weapons (with the exception of fire-arms), and weapon-materials of all kinds -	„	„	6 0	0 12 0
„ „ writing-pens, watch (clock) materials and works, guns (fire-arms) of all kinds, bracelets and necklaces mounted on bands - -	„	69 *c.* 1.	15 0	1 10 0
„ „ children's playthings in conjunction with woven or textile goods, or with real gilt or plated base metals -	„	„	15 0	1 10 0
„ „ sewing-needles (also with gilt or plated eyes) - -	„	69 *d.*	15 0	1 10 0
„ „ smoothing-iron (tailor's goose), of iron not polished off, also in conjunction with wood - - -	„	69 *a.* 3.	2 0	0 4 0
„ „ smoothing-iron, do., of iron, polished off, varnished, also in conjunction with wood -	„	69 *c.* 3.	4 0	0 8 0
„ „ smoothing-iron of iron, polished, lacquered, also with handles covered with leather or woven goods - -	„	69 *c.* 2.	6 0	0 12 0
„ „ smoothing-iron of copper, brass - - -	„	70 *c.* 2.	6 0	0 12 0
Isinglass - - - - -	XX.	76 *b.* 1.	0 75	0 1 6
Ivory, rough, only cut - - -	VIII.	31 *a.* 2.	Free.	
„ wastes - - - -	„	„	Free.	
„ goods - - - -	XVI.	68 *b.* 1.	15 0	1 10 0
J.				
Jaconets, cotton - - - -	XIII.	52 *a.* 1.	16 0	1 12 0
Jam (made of fruit), with sugar - -	VII.	28 *e.* 1.	10 0	1 0 0
„ „ without sugar - -	III.	9 *b.* 2.	0 80	0 1 7
Japan, earth (catechu) - - -	IX.	34 *a.* 1.	Free.	
Jars, earthenware - - - -	XVI.	67 *a.*	0 25	0 0 6
Jellies, for table - - - -	VII.	28 *e.* 1.	10 0	1 0 0
„ animal (which have an unpleasant gluey taste and smell when wetted) - - - -	XX.	76 b. 1.	0 75	0 1 6
„ others (entirely tasteless and devoid of smell) - - - -	„	76 *d.* 1.	5 0	0 10 0
Jet (black amber) - - - -	VIII.	31 *a.* 1.	Free.	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Jewellery. *See* Precious Stones.				
Jewsharps	XVII.	69 *c.* 2.	6 0	0 12 0
Joiners' wares, coarse, rough, uncoloured	XVI.	64 *a.*	Free.	
„ „ painted, lacquered, polished	„	64 *c.* 1.	1 50	0 3 0
„ „ with carving or fine turner's work	„	64 *d.* 2.	6 0	0 12 0
Juices, for relish, made from fruit, berries, and turnips, also with sugar, honey, or boiled sugar	III.	9 *b.* 2.	0 80	0 1 7½
Jujubes, black and red	III.	13 *h.* 1.	0 80	0 1 7½
Juniper berries	„	13 *c.*	0 6	0 0 1½
„ „ essential oil of (in small casks)	IX.	33 *a.* 2.	3 0	0 6 0
Jute, or Calcutta hemp, raw, water-retted, broken, hat-shelled	XI.	46	Free.	
„ fabrics. *See* Linen Yarn.				
„ textures, coarse, rough	XIII.	53 *a.*	0 75	0 1 6
„ textures, with coloured stripes woven in, if they consist of jute, and do not occur again throughout the breadth, or if they are made on one side on the edge, whether they be larger or smaller, similar or dissimilar	„	53 *a.*	0 75	0 1 6
K.				
Kali, carbonate of potash	IX.	37 *a.*	Free.	
„ chloride	„	37 *c.* 1.	0 40	0 0 10
„ sulphate and bisulphate	„	„	0 40	0 0 10
„ chromate of potash	„	37 *e.* 1.	1 50	0 3 0
„ bi-carbonate of potash	„	„	1 50	0 3 0
„ oxalide (sorrel salt)	„	37 *f.* 1.	2 0	0 4 0
„ prussiate of potash (red and yellow prussiate)	„	37 *f.* 2.	1 50	0 3 0
„ tungstate of potash (for blue dyes)	XX.	76 *d.* 1.	5 0	0 10 0
„ pure carbonate of potash (tartrate)	„	„	5 0	0 10 0
„ chlorate of potash (super-oxydised chloride)	„	„	5 0	0 10 0
„ superphosphate	XXII.	80 *a.*	Free.	
„ nitrate. *See* Saltpetre.				
Kamptulicon, floor cloths of rasped cork and india-rubber (or gutta-percha) uncoloured	XVI.	64 *b.*	0 75	0 1 6
„ coloured	„	64 *c.* 1.	1 50	0 3 0
„ with lining of cloth stuff, coloured or uncoloured	„	64 *d.* 2.	6 0	0 12 0
Kermes, mineral (a preparation of antimony)	XX.	76 *d.* 1.	5 0	0 10 0
„ berries (plant berries)	III.	13 *h.* 1.	0 80	0 1 7½
„ „ insect (alkermes, scarlet berries, coccus ilicis)	IX.	34 *f.*	0 75	0 1 6

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Kettledrums	XIX.	73 *a.*	3 0	0 6 0
Kettles made of lead	X.	39 *b.*	2 50	0 5 0
	XVII.	68. 3.	4 0	0 8 0
„ cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ wrought iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ (steam boilers)	XIX.	74	1 0	0 2 0
„ of zinc	XVII.	70 *a.* 1.	4 0	0 8 0
„ of tin	„	70 *a.* 2.	2 50	0 5 0
„ of other base metals	„	70 *b.* 1.	4 0	0 8 0
„ as parts of machines	XIX.	74	1 0	0 2 0
Keys, wrought iron, rough	XVII.	69 *a.* 1.	4 0	0 8 0
„ of tempered cast iron, rough	„	69 *a.* 3.	2 0	0 4 0
„ „ „ ground off	„	69 *c.* 3.	4 0	0 8 0
„ „ „ polished lacquered	„	69 *c.* 2.	6 0	0 12 0
Kitchen. *See* pots made of cast iron.				
„ Utensils, wooden, rough	XVI.	64 *a.*	Free.	
„ „ painted, lacquered, polished	„	64 *c.* 1.	1 50	0 3 0
„ „ others	- -	- -	According to quality of material.	
Knick-knacks made of iron	According to material.			
„ „ of other base metals				
„ „ clinched (not real gilt or silvered)				
„ „ real gilt or silvered, or inlaid with gold or silver				
„ „ made of common metals, fine worked				
„ „ not clinched, in conjunction with alabaster, ivory, enamel, glass, gall, &c.				
Knitting-needles, of iron	XVII.	69 *c.* 2.	6 0	0 12 0
Knives, rough, for mechanical purposes; also in conjunction with wood	„	69 *b.* 1.	4 0	0 8 0
„ ground	„	69 *c.* 3.	4 0	0 8 0
„ polished or in other combinations	„	69 *c.* 2.	6 0	0 12 0
„ with tortoiseshell or amber handles	XIX.	75 *c.* 1.	50 0	5 0 0
„ with gold or silver handles	„	75 *b.* 1.	75 0	7 10 0
„ with real gilt or plated metal handles	„	75 *b.* 3.	25 0	2 10 0
„ with imitation gilt or plated metal handles	„	75 *c.* 2.	25 0	2 10 0
L.				
Labels, printed	XXI.	79 *b.*	Free.	
„ prepared, lithographed, printed	XIV.	60 *c.*	1 50	0 3 0
Lac dye, prepared from seed-lac	IX.	34 *f.* 2.	0 75	0 1 6
„ varnishes (*see* varnishes).				
Lacquers, dye-lacs	XX.	76 *d.* 1.	5 0	0 10 0
Lace, cotton	XIII.	52 *d.*	60 0	6 0 0
„ linen	„	53 *g.*	70 0	7 0 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Lace, woollen	XIII.	54 *f.*	60 0	6 0 0
„ silk	„	55 *a.* 2.	80 0	8 0 0
„ (fashionable wares, viz., in the form of collars, cuffs, chargeable like lace; and in cases of its being further worked by sewing and such like, chargeable in the same way as articles of dress)			According to quality.	
„ pictures, on paper, with edged embellishments perforated like lace, more or less broad	XXI.	79 *b.*	Free.	
„ cloths, woollen	XIII.	54 *f.*	60 0	6 0 0
„ „ silk	„	55 *a.* 2.	80 0	8 0 0
„ *goods,* cotton	„	52 *b.* 3.	30 0	3 0 0
„ „ linen	„	53 *e.*	40 0	4 0 0
„ „ woollen	„	54 *c.* 2.	35 0	3 10 0
„ „ entirely of silk	„	55 *a.*	80 0	8 0 0
„ „ partly	„	55 *b.*	60 0	6 0 0
„ „ the above combined with other materials (not woven or textile goods)	XIX.	75 *b.*	75 0	7 10 0
„ „ of real gold or silver spinnings, also of gilded or silvered Lyonnese spinnings	„	75 *a.*	75 0	7 10 0
„ „ of not genuine Lyonnese spinnings and thread wires	„	75 *c.*	25 0	2 10 0
Ladies' ornaments. (*See* Gentlemen and Ladies' Ornaments under G.)				
Ladders, wooden	XVI.	64 *a.*	Free.	
Lambs	IV.	15 *e.*	0 18	0 0 4½
Lambskins, in a raw condition (also whitened, but not lined or otherwise worked)	XV.	61 *a.*	4 50	0 9 0
Lamps, iron, also copper, tinned	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ polished, lacquered, enamelled	„	69 *c.* 2.	6 0	0 12 0
„ of other base metals	„	70 *c.* 2.	6 0	0 12 0
Lamps, entirely or partly of precious metals	XIX.	75 *a.*	75 0	7 10 0
„ of base metals, real gilt or plated	„	75 *b.* 3.	25 0	2 10 0
„ others			According to quality of material.	
„ globes for (likewise shades and dishes) white, not transparent, without decorations	XVI.	65 *c.* 3.	1 0	0 2 0
„ globes for, others	„	65 *d.* 1.	6 0	0 12 0
Lancets,	XIX.	73 *b.*	Free.	
Lanterns, of glass	XVI.	65 *d.* 1.	6 0	0 12 0
„ with real or imitation gilt or plated metals, or with other hardwares	XIX.	75	0 75	0 1 6
„ magic			According to nature of material.	
Lapis causticus (caustic)	XX.	76 *d.* 1.	5 0	0 10 0
Lard	VI.	22 *a.* 1.	2 63	0 5 3
Lastings, woollen	XIII.	54 *a.*	4 50	0 9 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois:	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Lasts, shoemakers'	XVI.	64 *a.*	Free.	
Laterna magica, magic lanterns, as a toy			According to quality of material.	
Laurel leaves	III.	13 *h.* 1.	Free.	
„ oil (bay oil)	IX.	33 *a.* 2.	3 0	0 6 0
Laurels	III.	13 *e.* 1.	Free.	
Lavender, spirit of, according to the quality of the receptacles and the labels	IX.	33 *b.* 2.	5 0	0 10 0
	XX.	76 *c.* 2.	12 0	1 4 0
Lead, raw, also old, broken	X.	39 *a.* 1.	0 75	0 1 6
„ cast, rolled, drawn	„	39 *b.* 2.	2 50	0 5 0
„ rolled	„	39 *b.* 1.	2 50	0 5 0
„ wastes	„	39 *a.* 1.	0 75	0 1 6
„ ashes	„	„	0 75	0 1 6
„ wire	„	39 *b.* 2.	2 50	0 5 0
„ ore, sulphuret of lead (Galena)	„	38 *a.* 1.	Free.	
„ dross	XXII.	80 *b.*	Free.	
„ litharge (silver and gold)	„	39 *a.* 3.	0 75	0 1 6
„ capsules, tinned	XVII.	68. 2.	6 0	0 12 0
„ oxide of, red and yellow	IX.	37 *f.* 2.	1 50	0 3 0
„ pencils, in wood or cane	XX.	76 *c.* 3.	6 0	0 12 0
„ not in wood or cane	„	76 *c.* 1.	15 0	1 10 0
„ white (carbonate of lead)	IX.	37 *f.* 2.	1 50	0 3 0
„ sugar of	XX.	76 *d.* 1.	5 0	0 10 0
„ black (graphite)	VIII.	32 *b.*	Free.	
Leaden goods	XVII.	68. 2.	6 0	0 12 0
„ children's playthings, made of tin, without or in conjunction with other materials not coming under the category of hardwares	„	„	6 0	0 12 0
„ rollers, kettles, dishes, plates, pots, and other kinds of cooking utensils made of lead, inasmuch as they do not come under the category of 39 *b.* 2	„	68. 3.	4 0	0 8 0
„ perforated sheets and plates	„	„	4 0	0 8 0
Leather, only blackened; also uppers and cordwainers' leather, only blackened	XV.	62 *a.* 4.	3 0	0 6 0
„ artificial scraped leather, made of india-rubber, or grainless leather cuttings, or of a layer of linen or cotton texture, which serves to strengthen it	„	62 *a.* 3.	4 50	0 9 0
„ male hemp leather, varnished with coarse yellow or red colour	„	62 *a.* 6.	1 0	0 2 0
„ goat's, sheep's, tanned, not coloured or further prepared	„	62 *a.* 5.	0 75	0 1 6
„ „ dressed in tan, not further prepared	„	„	0 75	0 1 6
„ sheep's, tanned in alum, and in which the alum is still present	„	„	0 75	0 1 6
„ „ out of which the alum has already been beaten	„	62 *b.* 1.	7 50	0 15 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Leather, chamois, dressed and tawed -	XV.	62 *b.* 1.	7 50	0 15 0
„ with impressed ornaments and uncoloured parchment - -	„	62 *b.* 3.	3 0	0 6 0
„ lacquered, coloured, gilt, plated; likewise Cordovan, Morocco, and Turkey leather - - -	„	62 *b.* 1.	7 50	0 15 0
„ (glove and kid glove), tanned, coloured (already adapted for immediate use) - - -	„	„	7 50	0 15 0
NOTE.—Black coloured leather is only to be distinguished from that simply blackened by its not losing its colour when in a damp state, as the latter does.				
„ cuttings - - - -	XXII.	80 *d.*	Free.	
„ size - - - -	XX.	76 *b.* 1.	0 75	0 1 6
„ strips, like hat strips.				
„ pieces of, old, torn-up - -	XXII.	80 *d.*	Free.	
„ cloth - - - -	XIII.	56 *b.* 2.	5 0	0 10 0
„ goods, of tanned, tan coloured, or only blackened leather -	XV.	62 *c.*	6 0	0 12 0
„ „ made of hairy skins -	„	„	6 0	0 12 0
„ „ of common leather, with pressed ornaments -	„	62 *d.* 3.	10 50	1 1 0
„ „ of coloured or lacquered -				
„ „ of gilt, plated, chamois-dressed, or tawed leather				
„ „ of coloured parchment -				
All these goods also combined with materials not coming under the category of Petty Wares. *See also* Saddlery, Shoemakers' and Trunkmakers' goods.				
„ „ leather gloves (also those only cut out, or combined with woven and textile goods) - - -	„	62 *b.* 1.	7 50	0 15 0
„ Russian - - - -	„	62 *a.* 4.	3 0	0 6 0
Leaves, natural, fresh - - -	III.	13 *c.*	Free.	
„ dried - - - -	„	13 *h.* 1.	0 80	0 1 7½
„ artificial, of woven or textile materials - - - -	XIII.	57 *c.* 1.	85 0	8 10 0
„ others, artificial - - -	- -	- -	According to quality of material.	
Leeches - - - - -	IV.	16 *c.*	Free.	
„ artificial - - - -	XIX.	73 *b.*	Free.	
Lees, natural - - - -	XXII.	80 *b.*	Free.	
„ compressed, artificial, dried - -	XX.	76 *d.* 1.	5 0	0 10 0
Leguminous plants, with the leaves -	III.	13 *c.*	Free.	
„ „ other kinds, *i.e.*, beans, peas, lentils, tares, sweet peas (nipplewort) - -	„	10 *b.*	0 27	0 0 6½

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Lemnian earth (sphragide bole, a kind of fine clay)	VIII.	32 *b.*	Free.	
Lemonades, essences, powders, and waters	VII.	28 *e.* 1.	10 0	1 0 0
Lemons	I.	5 *b.* 3.	2 20	0 4 5
„ (put in salt-water, cut up)	„	5 *c.* 1.	0 80	0 1 7½
„ citrate of (citric acid)	XX.	76 *d.* 1.	5 0	0 10 0
„ juice of, in barrels	IX.	35 *b.* 3.	Free.	
„ „ „ bottles	XX.	76 *d.* 3.	Free.	
„ peel of, dried (put in salt-water cut up)	I.	5 *c.* 1.	0 80	0 1 7½
Lentils. *See* Leguminous plants	III.	10 *b.*	0 27	0 0 6½
Leonine, wire and spinnings, imitation gilt or plated	XVII.	70 *c.* 2.	6 0	0 12 0
„ „ „ real	XIX.	75 *b.* 3.	25 0	2 10 0
„ „ „ of gold or silver	„	75 *a.* 2.	75 0	7 10 0
„ spinnings, workings from it, genuine	„	„	75 0	7 10 0
„ „ real gilt or plated	„	75 *b.* 1.	75 0	7 10 0
„ „ imitation „ „	„	75 *c.* 2.	25 0	2 10 0
Letter-cases (or pocket books), of leather or india-rubber	XV.	62 *d.* 3.	10 50	1 1 0
„ „ „ „ of oil-cloth	„	„	10 50	1 1 0
„ „ „ „ of the above with embroidery	XIX.	75 *b.* 2.	50 0	5 0 0
„ „ „ „ combined with precious metals	„	75 *b.* 1.	75 0	7 10 0
„ „ „ „ combined with base metals	„	75 *b.* 3.	25 0	2 10 0
„ „ „ „ others	-	-	According to quality of material.	
Letters, type, book printers' type, of lead	X.	39 *b.* 1.	2 50	0 5 0
„ others	-	-	According to quality of material.	
Liebig-Liebe's food (made of malt, wheaten-flour, and carbonate of potash)	XX.	76 *d.* 1.	*5 0*	*0 10 0*
Light, shades	-	-	*According to quality of material.*	
Lime, burnt and unburnt	VIII.	32 *a.*	Free.	
„ phosphorate, in pieces, (for making artificial manure)	„	„	Free.	
„ citrate	IX.	37 *d.* 2.	Free.	
„ tartrate	XX.	76 *d.* 3.	Free.	
„ acetate	„	76 *d.* 1.	5 0	0 10 0
„ in conjunction with pyroligneous acid	IX.	37 *e.* 2.	0 75	0 1 6
„ stones, raw	VIII.	32 *a.*	Free.	
„ blossoms	III.	13 *h.* 1.	0 80	0 1 7½
Linen yarn, rough, machine-spun	XII.	50 *a.* 1.	0 75	0 1 6
„ „ rough, hand-spun	„	50 *a.* 2.	Free.	
„ „ bleached, coloured (but not twisted)	„	50 *b.*	2 50	0 5 0
„ „ twisted	„	50 *c.* 1.	6 0	0 12 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Linen goods, *i.e.*, linen of flax, raw hemp, unbleached, unsampled (also ticking and huckaback) -	XIII.	53 *c.* 1.	6 0	0 12 0
„ „ made of jute only - - -	„	53 *c.* 2.	3 0	0 6 0
„ „ dressed, bleached, coloured, of one or more colours, close, also sampled or printed, mixed, watered:				
up to 50 chain threads -	XIII.	53 *d.* 2.	10 0	1 0 0
50–100 „ -	„	53 *d.* 1.	20 0	2 0 0
100 „ -	„	53 *e.*	40 0	4 0 0
to the Vienna current inch.				
„ „ not close - - - -	„	53 *f.*	60 0	6 0 0
„ „ embroidered - - -	„	53 *g.*	70 0	7 0 0
„ „ combined with metal threads or spun glass - -	„	„	70 0	7 0 0
„ „ highly lined } combined with whatever material }	XIX.	75 *b.* note *a.* 6.	75 0	7 10 0
„ „ others - }	„	75 *b.* note *c.* 2.	25 0	2 10 0
„ print, combined with fine resin and other chemicals to cover over cotton stuff - - - - -	XIII.	56 *b.*	10 0	1 0 0
Linseed - - - - -	III.	13 *e.* 2.	Free.	
„ cake, and linseed cake meal (rape cake meal) - - - -	XXII.	80 *b.*	Free.	
Lint, picked - - - -	„	80 *c.*	Free.	
„ woven, linen - - - -	XIII.	53 *d.* 1.	20 0	2 0 0
Lintels of stone, not ground off - - }	XVI.	66 *b.*	Free.	
„ of stone, ground off - - }		note 2.		
„ others - - - -	-	-	According to quality of material.	
Liqueurs - - - - -	VII.	26 *b.*	15 0	1 10 0
Liquorice juice - - - -	IX.	33 *a.* 3.	2 0	0 4 0
„ root - - - -	III.	13 *h.* 1.	0 80	0 1 7½
Literary Subjects } also bound - {	XXI.	79 *a.*	Free.	
Lithographs, on paper }	„	79 *b.*	Free.	
„ painted like oil paintings, varnished, and pasted upon linen, stretched on a wooden frame - -	„	79 *c.*	Free.	
Lithographic stones - - -	VIII.	32 *b.*	Free.	
„ „ - - -	XXI.	79 *b.*	Free.	
Litmus - - - - -	IX.	34 *f.* 2.	0 75	0 1 6
Liver (animal) - - - - {	V.	19	0 80	0 1 7½
	VII.	28 *e.* 1.	10 0	1 0 0
Llama, and wraps of a similar nature (a kind of flannel) not printed - -	XIII.	54 *c.* 1.	85 0	3 10 0
Loadstone (iron ore) - - -	X.	38 *a.* 1.	Free.	
Loam - - - - -	VIII.	32 *a.*	Free.	
Lobsters - - - - -	IV.	14 *d.*	Free.	
Locks, iron - - - - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ varnished - - - -	„	69 *c.* 3.	4 0	0 8 0
„ iron, polished, lacquered - -	„	69 *c.* 2.	6 0	0 12 0
„ others - - - -	-	-	According to quality of material.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Locksmith's utensils	XVII.	69 *a.* 3.	2 0	0 4 0
Locomotives and locomobiles	XIX.	74 *c.*	2 0	0 4 0
Looms, wooden	XVI.	64 *a.*	Free.	
„ iron, mechanical (power looms)	XIX.	74	2 0	0 4 0
Lump sugar	I.	7 *a.*	13 15	1 6 3½
Lunettes (lorgnettes). *See* Eye-glasses.				
M.				
Maccaroni	VII.	28 *b.* 2.	2 50	0 5 0
Mace. *See* Nutmegs	I.	3 *b.* 2.	0 80	0 1 7½
Machine, spinnings, linen, rough	XII.	50 *a.* 1.	0 75	0 1 6
„ driving straps covered over with, or steeped in, india-rubber or gutta-percha	XIII.	56 *c.* 3.	1 0	0 2 0
Machinery (parts of)				
„ „ iron, common, forged, the piece weighing 50 pounds and over	X.	40 *g.* 2.	1 25	0 2 6
„ „ of inferior cast iron, coarse (in inferior castings.)	„	40 *i.* 1.	0 60	0 1 2½
„ „ of rough cast zinc (in inferior castings.)	„	42 *b.* 1.	1 50	0 3 0
„ „ „ pewter (in inferior castings.)	„	43 *b.*	2 0	0 4 0
„ „ „ copper, brass, and other base metals (in inferior castings.)	„	43 *c.* 2.	3 0	0 6 0
„ „ inferior wooden	XVI.	64 *a.*	Free.	
„ „ wooden (agricultural) also combined with iron, in so far as the weight of the iron parts does not exceed 15 per cent. of the total weight	„	„	Free.	
„ „ wooden, combined with iron, chip, reed, bulrush, cane and basket work goods, with brass, zinc, common leather, or window glass, also coloured, stained, varnished, lacquered, and polished	„	64 *c.*	1 50	0 3 0
„ „ wooden, in other combinations; further, wooden portions of machinery of fine basket work, of fine carving and turnery work, covered over with a varnish containing gold or silver, of inlaid or buhl work	XVI.	64 *d.* 2.	6 0	0 12 0
„ „ wooden, combined with iron of more than 15 per cent. of the total weight	XIX.	74 *a.*	1 0	0 2 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Machinery, of cast iron - (neither gilt, nor plated, according to the parts which prevail in the weight.)	XIX.	74 *b.*	1 33	0 2 8
„ „ wrought iron	„	74 *c.*	2 0	0 4 0
„ „ base metal not specially named	„	74 *d.*	4 0	0 8 0
Madder, ground and unground	IX.	34 *d.*	Free.	
„ extracts of	„	34 *f.* 1.	0 80	0 1 7½
„ varnish	XX.	76 *d.* 1.	5 0	0 10 0
„ roots, fresh (Alizzari)	III.	9 *a.*	Free.	
„ „ ground and unground	XX.	34 *d.*	Free.	
Magnesia, carbonate and carbonic	„	76 *d.* 1.	5 0	0 10 0
Magnifying-glasses (single microscopes)	XIX.	73 *b.*	Free.	
Mahogany, brown	VIII.	29 *c.*	Free.	
Maize	III.	10 *b.*	0 27	0 0 6½
NOTE.—Maize in the cob is subject to half the rate.				
„ **straw,** *i.e.*, empty maize cobs	„	13 *c.*	Free.	
Malachite green	XX.	76 *d.* 1.	Free.	
Malaga-grapes	I.	5 *a.* 2.	2 50	0 5 0
Malt	III.	10 *c.*	0 18	0 0 4
„ extract, thin fluid	VII.	24 *e.*	1 50	0 3 0
„ „ like syrup	XX.	76 *d.* 1.	5 0	0 10 0
Maltese-earth (white boll)	VIII.	32 *b.*	Free.	
Manganese	„	„	Free.	
Manilla-hemp (aloe-fibres) from the pith of the bread-tree	XI.	46	Free.	
„ twisted, unbleached	XIII.	53 *a.*	0 75	0 1 6
„ „ coloured	XII.	50 *b.*	2 50	0 5 0
Manna	IX.	33 *a.* 4.	0 75	0 1 6
„ groats	III.	13 *h.* 1.	0 80	0 1 7½
Manometers (steam gauges) for measuring the pressure of vapours and gases	XIX.	73 *b.*	Free.	
Manure, animal	XXII.	80 *b.*	Free.	
„ artificial	XX.	76 *d.* 1.	5 0	0 10 0
„ salt	XXII.	80 *a.*	Free.	
Manuscripts. *See* Preface to the Customs' Tariff.				
Maps, made of pasteboard and paper	XIV.	60 *g.* 2.	6 0	0 12 0
„ „ leather, india-rubber, gutta-percha	XV.	62 *d.* 3.	10 50	1 1 0
„ combined with woven stuffs	XIX.	75 *c.* 2.	25 0	2 10 0
„ others	-	-	According to quality of material.	
„ scientific, also bound	XXI.	79 *a.*	Free.	
„ of countries	„	„	Free.	
„ model, of paper pulp	„	„	Free.	
„ „ of india-rubber				
„ „ of gutta-percha				
Maraschino-liqueur	VII.	26 *b.*	15 0	1 10 0
Marble, blocks of, rough	VIII.	32 *a.* 1.	Free.	
„ „ cut, polished	„	32 *c.* 1.	0 80	0 1 7½

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Marigolds, fresh	III.	13 *c.*	Free.	
„ others	„	13 *h.* 1.	0 80	0 1 7½
Marine animals, in oil and so forth	VII.	28 *e.* 1.	10 0	1 0 0
Marjoram	„	„	0 80	0 1 7½
Markers (counters, fish,) of base metal	XVII.	70 *c.* 2.	6 0	0 12 0
„ others	- -	- -	According to quality of material.	
Masks, of paper pulp	XIV.	60 *g.* 2.	6 0	0 12 0
„ of woven stuffs	XIII.	57 *a.* 1.	25 0	2 10 0
„ of embossed wax	XIX.	75 *c.* 2.	25 0	2 10 0
„ others	- -	- -	According to quality of material.	
Matches, lucifer	XX.	78 *a.*	Free.	
Matrices (die sinking)	- -	- -	According to quality of material.	
Mats, woven out of Manilla hemp, reed, and wool, not printed	XIII.	54 *b.* 1.	15 0	1 10 0
„ made of bast, reed, cocoa-nut fibres, grass, seaweed, bulrush, and straw, uncoloured	XIV.	59 *a.*	0 25	0 0 6
„ „ „ coloured	„	59 *c.* 1.	2 50	0 5 0
„ and feet mats (hearthrugs), of shavings or cane	„	59 *d.* 1.	6 0	0 12 0
„ of tree-roots. *See* Basket-work.				
Mattrasses, with covering of woven goods. *See* Featherbeds.				
„ with covering of leather, india-rubber, or gutta-percha, of every kind	XV.	62 *c.*	6 0	0 12 0
Mead (metheglin)	VII.	24 *b.*	1 50	0 3 0
Measures, for distances	XIX.	73 *b.*	Free.	
Meat, fresh	V.	19 *a.*	0 80	0 1 7½
„ salt, smoked, pickled	„	19 *b.*	1 50	0 3 0
„ prepared in other ways	VII.	28 *e.* 1.	10 0	1 0 0
„ grit (a mixture of meat and oatmeal grit), also in tin cases	V.	19 *b.*	1 50	0 3 0
„ sausages (also blood, liver, and bacon sausages)	„	19 *c.*	8 0	0 16 0
Meats, preserved, of salted, smoked, pickled meat, which must first be adapted by further preparation for human consumption; also in bottles, cases, &c.	„	19 *b.*	1 50	0 3 0
Medallions (lockets), mounted	- -	- -	According to quality of material.	
Medals, of base metals	X.	43 *c.* 2.	3 0	0 6 0
Medicinal vinegars, honey, wines	XX.	76 *a.*	15 0	1 10 0
Medlars, fresh	III.	9 *a.*	Free.	
„ dried, parched, boiled without sugar	„	9 *b.* 2.	0 80	0 1 7½
„ prepared in other ways	„	28 *e.* 1.	10 0	1 0 0
Meerschaum	VIII.	31 *a.*	Free.	
„ wastes	„	„	Free.	
„ goods	XVI.	66 *c.*	6 0	0 12 0
„ combined with petty wares	XIX.	75 *a.*	75 0	7 10 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Melons, fresh	III.	9 *a.*	Free.	
,, cut up, pickled in vinegar in barrels	,,	9 *b.* 2.	0 80	0 1 7½
,, prepared in other ways	VII.	28 *e.* 1.	10 0	1 0 0
Merino, printed on	XIII.	54 *d.*	35 0	3 10 0
,, not printed on	,,	54 *c.* 1.	35 0	3 10 0
Metal beads, real gilt	XVII.	70 *c.* 2.	6 0	0 12 0
,, ,, plated, or covered with gold or silver	,,	70 *c.* 1.	15 0	1 10 0
,, cloth, made of brass wire, also combined with strings	,,	70 *c.* 2.	6 0	0 12 0
,, **wares,** rollers of tin	,,	70 *a.* note 2.	4 0	0 8 0
,, ,, common, as rollers, kettles, &c.	,,	70 *a.*	5 0	0 10 0
,, ,, fine	,,	70 *c.*	15 0	1 10 0
,, ,, plates, dishes, pots, and other cooking utensils made of zinc (not lacquered and not combined with other materials.)	,,	,,	4 0	0 8 0
,, ,, dishes, plates, kettles, and other vessels made of tin (not lacquered and not combined with other materials.)	,,	70 *a.* 2.	2 50	0 5 0
,, ,, rollers, kettles, dishes, plates, and other cooking utensils made of other base metals	,,	70 *b.*	4 0	0 8 0
,, ,, others which are also combined with materials not coming under the category of petty wares	,,	70 *c.* 2.	6 0	0 12 0
,, ,, real gilt, plated, or covered with gold or silver	XIX.	75 *b.* 1.	75 0	7 10 0
,, ,, braziers', brass founders', and brass plate wares	XVII.	70 *c.* 2.	6 0	0 12 0
,, ,, perforated plates and tablets	,,	70 *c.* 3.	4 0	0 8 0
Metronomes	XIX.	73 *b.*	Free.	
Mexican fibres (finer than hemp, it looks like Manilla hemp)	XI.	46.	Free.	
Microscopes	XIX.	73 *b.*	Free.	
Milk (also turned)	V.	21 *a.*	Free.	
,, condensed	XX.	76 *d.* 1.	5 0	0 10 0
,, glass. *See* Glass.				
,, sugar of	,,	,,	5 0	0 10 0
Mill, products (rolled, rough ground, peeled grains)	III.	12	0 80	0 1 7½
,, stones, also with iron hoops and metal cases	VIII.	32 *a.*	Free.	
Milled woollen stuffs	XIII.	54	According to quality.	
Mills, made of wood	XVI.	64 *a.*	Free.	
Mineral blue	XX.	76 *d.* 1.	5 0	0 10 0
,, yellow (imperial gallon)				
,, green (*i.e.*, imperial green, Viennese or new green, Kirchberg green, original green, Jassnugger green, Mitis green, Schweinfurt green)	,,	,,	5 0	0 10 0

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			fl. kr.	£ s. d.
Mineral, kermes	IX.	37 *d.* 1.	0 75	0 1 6
„ oil. *See* Rock-oil.				
„ red	XX.	76 *d.* 1.	5 0	0 10 0
„ tar-oil. *See* Rock-oil.				
„ waters, natural and artificial	IX.	37 *a.*	Free.	
Minerals, not specially named, ground or washed	VIII.	32 *d.* 1.	0 80	0 1 7½
Minium (red lead)	IX.	37 *e.* 1.	1 50	0 3 0
Mirabelles (plums) fresh	III.	9 *a.*	Free.	
„ „ dried, parched	„	„	Free.	
„ „ boiled without sugar	„	9 *b.* 2.	0 80	0 1 7½
„ „ prepared in other ways	VII.	28 *e.* 1.	10 0	1 0 0
Mirrors, framed	XVI.	65 *e.* 2.	6 0	0 12 0
„ glass for, rough	„	65 *a.* 2.	0 75	0 1 6
„ „ ground	„	65 *e.* 2.	6 0	0 12 0
„ „ ground or unground, over 284 square inches	„	„	6 0	0 12 0
„ „ ground or unground, not over 284 square inches	„	65 *d.* 1.	6 0	0 12 0
Mithridate	XX.	76 *a.*	15 0	1 10 0
Mixed pickles (are subject to examination by the sanitary police)	VII.	28 *e.* 1.	10 0	1 0 0
Mixtures	XX.	76 *a.*	15 0	1 10 0
Models of machines, wooden	XVI.	64 *a.*	Free.	
„ others	-	-	According to quality of material.	
„ workings of. *See* Stonework.				
Mohairs (woollen stuff)	XIII.	54	4 50	0 9 0
Moire antique (silk stuff)	„	55	80 0	8 0 0
Molasses	I.	7 *d.*	3 15	0 6 3½
Molton (a stuff-like flannel)	XIII.	54 *c.* 1.	35 0	3 10 0
Molybdena (black-lead, plumbago, graphite)	VIII.	32 *b.*	Free.	
Monuments of stone, over 10 pounds	XVI.	66 *b.* 2.	0 75	0 1 6
Morchia. *See* Olive oil.				
Morocco-leather, coloured, lacquered	XV.	62 *b.* 1.	7 50	0 15 0
Morphium (of opium)	XX.	76 *d.* 1.	5 0	0 10 0
Mortar (cement, plaster)	VIII.	32 *a.*	Free.	
Mortars, made of cast iron, coarse	X.	40 *a.* 1.	25 0	2 10 0
„ iron, neither half or entirely ground off	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ of serpentine stone (marmolite)	XVI.	66 *b.* 1.	Free.	
„ of copper, brass	XVII.	70 *c.* 2.	6 0	0 12 0
„ others	-	-	According to quality of material.	
Mosaic, pictures, of cotton textures, with a representation of arabesques, landscapes, pictures of coloured woollen yarn	XIII.	54 *e.*	50 0	5 0 0
„ others	-	-	Like work made of similar substances.	

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Mosaic goods of wood or other vegetable or animal carving materials	XVI.	64 *d.* 2.	6 0	0 12 0
„ „ „ made from stones	„	66 *c.*	6 0	0 12 0
„ „ „ others	- -	- -	According to quality of material.	
Moulds, wooden	„	64	Free.	
Mouth-glue	XX.	76 *b.* 1.	0 75	0 1 6
Mouthpieces for musical instruments	XIX.	73 *a.*	3 0	0 6 0
„ others	- -	- -	According to quality of material.	
Muffs, of fur	XV.	61 *b.*	50 0	5 0 0
„ other kinds	XIII.	57 *a.* 1.	25 0	2 10 0
Mulberries	III.	9 *a.*	Free.	
Mulberry-leaves	„	13 *b.*	Free.	
Mules (Hinnies)	IV.	15 *i.*	1 5	0 2 1
Mummies, portions of (in pieces or dust)	IX.	35 *d.* 2.	Free.	
Munition (ammunition). *See* Preface to Customs' Tariff.				
Mushrooms, fresh	III.	9 *a.*	Free.	
„ dried, parched, cut up, pickled in vinegar, in barrels	„	9 *b.* 1.	0 75	0 1 6
„ prepared in other ways	VII.	28 *e.* 1.	10 0	1 0 0
Music, printed (also bound music)	XXI.	79 *a.*	Free.	
Musk	IX.	33 *b.* 1.	7 50	0 15 0
„ membranes, films, empty	V.	21 *b.* 2.	0 75	0 1 6
„ rat-tails	IX.	33 *b.* 1.	7 50	0 15 0
Muslin, cotton	XIII.	52 *c.*	30 0	3 0 0
„ silk	„	55 *a.*	80 0	8 0 0
„ „ with cotton	„	55 *b.* 2.	60 0	6 0 0
„ de Laine	„	54 *a.*	4 50	0 9 0
„ book (cotton stuff)	„	52 *a.*	16 0	1 12 0
Must. *See* Wine.				
Mustard, ground (mustard powder), not in bladders	III.	13 *g.*	Free.	
„ „ in bladders, bottles, or pots	VII.	28 *d.* 2.	7 50	0 15 0
„ „ prepared	„	„	7 50	0 15 0
Myrrh trees	IX.	33 *a.* 1.	5 25	0 10 6
„ branches and leaves	III.	13 *h.* 1.	0 80	0 1 7½
N.				
Nailmakers' work	XVII.	69 *a.* 3.	2 0	0 4 0
Nails, wooden	XVI.	64 *a.*	Free.	
„ iron (with the exception of wiretack), cast rough	X.	40 *i.* 1.	0 60	0 1 2½
„ „ cast, turned, drilled, and wrought, black or only ground	XVII.	69 *a.* 3.	2 0	0 4 0
„ „ tinned, coppered	„	69 *a.* 1.	4 0	0 8 0
„ „ polished off, varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ polished, lacquered, also with brass crowns	„	69 *c.* 2.	6 0	0 12 0

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			fl. kr.	£ s. d.
Nails, others	- -	- -	According to quality of material.	
Naphtha (volatile mineral or tar oil)	IX.	35 *c.* 1.	0 75	0 1 6
„ (petroleum)	„	„	0 75	0 1 6
„ black	„	„	0 75	0 1 6
„ also white and red	„	„	0 75	0 1 6
„ natural	„	„	0 75	0 1 6
„ also that obtained by dry distillation from coals	„	„	0 75	0 1 6
„ for lighting purposes	„	„	0 75	0 1 6
Naves, wooden (middle portion of a wheel)	XIII.	64 *a.*	Free.	
Necklaces, of straw (mounted on bands)	XIV.	59 *f.* 3.	15 0	1 10 0
„ „ paper (mounted on bands)	„	60 *g.* 1.	12 50	1 5 0
„ „ leather or india-rubber (mounted on bands)	XV.	62 *d.* 2.	15 0	1 10 0
„ „ bone (mounted on bands)	XVI.	63 *b.* 1.	15 0	1 10 0
„ „ wood (mounted on bands)	„	64 *d.* 1.	12 0	1 4 0
„ „ glass (mounted on bands)	„	65 *c.* 1.	15 0	1 10 0
„ „ clay (mounted on bands)	„	67 *d.* 1.	15 0	1 10 0
„ „ lead (mounted on bands)	XVII.	68. 1.	12 0	1 4 0
„ „ iron (mounted on bands)	„	69 *c.* 1.	15 0	1 10 0
„ „ other base metals (mounted on bands)	„	70 *c.* 1.	15 0	1 10 0
„ gold and silver	XIX.	75 *a.*	75 0	7 10 0
„ real gilt, plated, or made up with gold or silver	„	75 *b.* 1.	75 0	7 10 0
„ of base metals, burnished (imitation gilt or plated)	„	75 *c.* 2.	25 0	2 10 0
„ not burnished, combined with alabaster, ivory, enamel, paste, &c.	XVII.	70 *c.* 1.	15 0	1 10 0
Neckties and collars, cut out, sewn like clothing	- -	- -	According to the material they are made from.	
Neckerchiefs (wrappers, mufflers) of cashmere or thibet, with shawl-edgings, like shawl-cloths	XIII.	54 *e.* 2.	50 0	5 0 0
Needles, of pine wood	III.	13 *c.*	Free.	
„ sewing needles, also with gilt or plated eyes	XVII.	69 *d.*	15 0	1 10 0
„ crotchet	„	69 *c.* 2.	6 0	0 12 0
„ knitting	„	„	6 0	0 12 0
„ others	- -	- -	According to quality of material.	
Nets, cotton, coarse	XIII.	52 *a.* 2.	12 0	1 4 0
„ linen, (unbleached)	„	53 *a.*	0 75	0 1 6
„ „ bleached, coloured	„	53 *d.* 3.	10 0	1 0 0
„ of jute, bleached	„	53 *d.* 4.	3 0	0 6 0
„ woollen, uncoloured	„	54 *a.*	4 50	0 9 0
„ silk	„	55 *a.* 3.	80 0	8 0 0
„ old	XXII.	80 *c.*	Free.	
New-green (Neugrün)	XX.	76 *d.* 1.	5 0	0 10 0
New Zealand hemp, coloured or otherwise prepared	III.	13 *h.* 1.	0 80	0 1 7½
Newspapers and periodicals (are subject to stamp duty)	XXI.	79 *b.*	Free.	

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Nickel, raw	X.	43 *a.*	Free.	
„ drawn, stretched, and in coarse pieces (cast)	„	43 *c.* 2.	3 0	0 6 0
„ ore and regulus	„	38 *c.*	Free.	
Night-lights, covered with tallow, stearine, or wax (also those with a little plate of wood or leaf of paper, or a so-called float, of brass, or tin plate combined with cork)	XII.	49 *b.* 2.	6 0	0 12 0
„ others	- -	- -	According to quality of material.	
Nihilum, album (oxide of zinc)	X.	38 *a.* 2.	Free.	
Nitric Acid (saltpetre, nitrate of soda) raw	IX.	37 *a.*	Free.	
„ do. do. refined	„	37 *d.* 1.	0 75	0 1 6
„ azotic acid (aqua fortis)	„	37 *c.* 2.	0 25	0 0 6
Nitro-muriatic acid	„	„	0 25	0 0 6
Nutmegs	I.	3 *b.*	15 75	1 11 6
„ oil of (balsam)	IX.	33 *b.* 1.	7 50	0 15 0
„ (mace)	I.	3 *b.*	15 75	1 11 6
Nuts, walnuts }	III.	9 *b.* 2.	Free.	
„ hazel }				
„ Para	„	13 *h.* 1.	0 80	0 1 7½

O.

Oak apples	IX.	34 *c.*	Free.	
„ **bark**	„	34 *b.*	Free.	
Oars, wooden	XVI.	64 *a.*	Free.	
Ochre	VIII.	32 *b.*	Free.	
Œnometer, for gauging wine-must fermentation	XIX.	73 *b.*	Free.	
Oil, varnish, in bottles	VI.	23 *a.*	5 0	0 10 0
„ „ in barrels, tubes, and bladders	„	23 *d.*	0 75	0 1 6
„ cake and meal (linseed cake)	XXII.	80 *b.*	Free.	
„ paper	XIV.	60 *c.*	1 50	0 3 0
„ seed	III.	13 *e.*	0 6	0 0 1½
„ soap, perfumed	XX.	77 *f.*	5 0	0 10 0
„ „ not perfumed	„	77 *e.* 1.	3 0	0 6 0
„ cloths (oil pressing cloths)	XIII.	54 *a.*	4 50	0 9 0
„ cloth, cotton, yellow }	-	„	56 *b.* 3.	12 0	1 4 0
„ „ fine (also lined with wool dust) }				
Oilcloth, superior (also covered with velvet powder)	„	56 *b.* 2.	5 0	0 10 0
Oilskin (oiled silk)	XIII.	56 *b.* 1.	10 0	1 0 0
Oils, fatty, in bottles and jars	VI.	23 *a.*	5 0	0 10 0
„ fatty in bottles and jars and other similar receptacles, weighing at least one centner, gross	„	23 *d.*	0 75	0 1 6
„ not specially named, in barrels, tubes, and bladders	„	23 *a.*	5 0	0 10 0
„ volatile	IX.	33 *b.* 2.	5 0	0 10 0
„ perfumed	XX.	76 *c.* 2.	12 0	1 4 0

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Oils, rock, black	IX.	35 *b.* 1.	Free.	
„ „ white and red	„	35 *a.* 1.	0 75	0 1 6
„ turpentine (also tar oil)	„	35 *c.* 2.	0 75	0 1 6
„ olive, in bottles and jars	VI.	23 *a.*	5 0	0 10 0
„ „ in barrels, tubes, and bladders	„	23 *b.* 2.	0 40	0 0 10
Olive branches	III.	13 *h.* 1.	0 80	0 1 7½
Olives, fresh	„	„	0 80	0 1 7½
„ salted	I.	5 *c.* 1.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
Onions (as well as bulbs and squills)	III.	9 *a.*	Free.	
Onyx. *See* Precious Stones.				
Opals. Ditto.				
Opera glasses	XIX.	75 *c.* 2.	25 0	2 10 0
Opium	IX.	33 *a.* 1.	5 25	0 10 6
Opodeldoc	XX.	76 *a.*	15 0	1 10 0
Optical glasses, unframed	XVI.	65 *c.* 1.	4 0	0 8 0
Orange blossoms	IX.	33 *a.* 1.	5 25	0 10 6
„ water	„	„	5 25	0 10 6
„ peel, dried	I.	5 *c.* 1.	0 80	0 1 7½
Oranges	„	5 *b.* 3.	2 20	0 4 5
„ dried, unripe, small	„	5 *c.* 1.	0 80	0 1 7½
Orchilla (Moro plaits)	XIII.	54 *e.* 1.	50 0	5 0 0
Organ pipes, wooden	XVI.	64 *a.*	Free.	
„ of other material	XIX.	73 *a.*	3 0	0 6 0
Organs, barrel, hurdy-gurdies and bird-calls	„	„	3 0	0 6 0
„ as playthings	-	-	According to quality of material.	
Oriental water, Dr. Walker's	XX.	76 *a.*	15 0	1 10 0
Original pictures, on paper	XXI.	79 *c.*	Free.	
Orleans (colouring material)	IX.	34 *f.* 1.	0 80	0 1 7½
„ extract	„	34 *g.* 1.	1 50	0 3 0
„ woollen stuff	XIII.	54 *a.*	4 50	0 9 0
Ornaments, woven	„	57 *a.*	25 0	2 10 0
Osiers	VIII.	29 *a.*	Free.	
Ossa sepia (black fish-bone)	V.	21 *b.* 1.	0 80	0 1 7½
Ostrich feathers, raw	„	18 *d.*	75 0	7 10 0
„ „ prepared	XIX.	75 *b.* 1.	0 75	0 1 6
Otters	IV.	14 *a.*	Free.	
Ovens (stoves) cast iron, coarse	X.	40 *i.* 1.	0 60	0 1 2½
„ wrought iron, or of sheet iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ wrought iron, or of sheet iron, polished, lacquered, enamelled	„	69 *c.* 2.	6 0	0 12 0
„ others	-	-	According to quality of material.	
Oxalic acid (saccharic acid)	IX.	37 *f.* 1.	2 0	0 4 0
Oxen (per head)	IV.	15 *a.*	4 20	0 8 5
„ hides of (East Indian, also those with hair on one side, covered over on the flesh side with a coating like lime)	V.	17 *a.*	Free.	
Oxide of zinc	X.	43 *a.*	Free.	
Oysters	IV.	14 *d.*	1 50	0 3 0
„ shells of, rough	VIII.	31 *a.* 2.	Free.	
„ „ prepared	XX.	76 *d.* 1.	5 0	0 10 0

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P.				
Packfong (an alloy of copper, nickel, and zinc, German silver), rough	X.	43 *a.*	Free.	
„ drawn, rolled, and in coarse castings	„	43 *c.* 2.	3 0	0 6 0
„ sheets } wires }	„	„	3 0	0 6 0
„ wares	XVII.	70 *c.*	15 0	1 10 0
Packing baskets, common	XVI.	64 *a.*	Free.	
„ cloth, grey	XIII.	53 *b.*	0 75	0 1 6
„ „ tarred	„	56 *a.*	1 0	0 2 0
„ „ other sorts, *see* linen wares.				
„ paper, rough	XIV.	60 *a.* 1.	Free.	
„ „ other kinds, sized	„	60 *c.*	1 50	0 3 0
Paint (for the face) white (flake white) *See also* Preface to Customs' Tariff.	XX.	76 *c.* 1.	15 0	1 10 0
„ red (rouge) *See* note to chemical products (superior).	„	76 *c.* 2.	12 0	1 4 0
Painters' paste	XIV.	60 *c.*	1 5	0 2 1
„ pallets	-	-	According to quality of material.	
„ cloth (canvas)	XIII.	56 *b.* 2.	5 0	0 10 0
„ brushes (made of hair)	XIV.	58 *b.* 1.	6 0	0 12 0
„ „ („ bristles)	XIII.	58 *a.*	1 0	0 2 0
Paintings, on paper	XXI.	79 *b.*	Free.	
„ on wood, linen, base metals	„	79 *c.*	Free.	
„ others	-	-	According to quality of material.	
Palm oil, in casks	VI.	23 *c.*	Free.	
„ „ candles	XX.	77 *b.*	5 25	0 10 6
„ „ grease	„	76 *b.* 1.	0 75	0 1 6
„ wax	V.	20 *b.*	2 50	0 5 0
„ branches	III.	13 *h.* 1.	0 80	0 1 7½
Panama hats (reed hats), not trimmed	XIV.	59 *d.* 3.	0 10	0 0 2½
Pans, cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ others (also wrought iron)	XVII.	69 *a.* 3.	2 0	0 4 0
„ iron, enamelled	„	69 *b.* 1.	4 0	0 8 0
„ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ others	-	-	According to quality of material.	
Paper, grey blotting, and coarse packing paper	XIV.	60 *a.* 1.	Free.	
„ made of straw, rough on both sides, or on only one	„	60 *a.* 2.	Free.	
„ not sized, inferior (common grey, semi-white, and coloured)	„	60 *b.* 2.	1 0	0 2 0
„ not sized, all other kinds	„	60 *b.* 1.	1 50	0 3 0
„ sized, stained, lithographed, printed, or lined	„	60 *c.*	1 50	0 3 0
„ „ with gold or silver patterns, pressed, perforated, also strips of it	„	60 *d.* 1.	6 0	0 12 0

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	Class.	Section.	Austrian Currency.	English Value.
Paper, sized, with linen, glued or pasted on (also if lined with cotton linen)	XIV.	60 *d.*	fl. kr. 6 0	£ *s.* *d.* 0 12 0
„ made from the stems and ribs of tobacco leaves - - -	II.	8 *b.*	26 25	2 12 6
„ (printing) unsized - - -	XIV.	60 *b.* 2.	1 0	0 2 0
„ „ sized - - -	„	60 *c.*	1 50	0 3 0
„ (letter) - - - -	„	60 *g.* 2.	6 0	0 12 0
„ work, made from paper and pasteboard; from pulp, patent wood (a fibrous pulp), wood-fibre pulp; frame or moulder's work from Cartonpierre, asphalt, or similar stuffs; also in combination with other materials, not coming under the category of petty or hardwares -	„	60 *g.* 2.	6 0	0 12 0
„ „ frame or moulder's works, other than the foregoing, combined with wood and iron, neither painted nor lacquered - - -	„	60 *g.* 3.	1 0	0 2 0
„ edgings (strips of gold, silver, or bronze paper) - - -	„	60 *d.* 1.	6 0	0 12 0
„ pulp, hard } (rag) - - -	XXII.	80 *c.*	Free.	
„ „ fluid }				
„ „ work made from,—same as paper work.				
„ wares. *See* Paper work.				
„ hangings, *i.e.*, all paper in rolls, printed with colours, coloured velvet powder - - -	XIV.	60 *c.*	1 50	0 3 0
Papier-maché work,—same as paper work.				
Paprika (Hungarian term, a red Turkish pepper) - - - -	I.	3 *a.*	8 0	0 16 0
„ green, in vinegar, in casks -	III.	9 *b.* 1.	0 75	0 1 6
„ green, prepared in other ways -	VII.	28 *e.* 1.	10 0	1 0 0
Para nuts - - - - -	III.	13 *h.* 1.	0 80	0 1 7½
Paradise apples (Adam's apples) - -	I.	5 *b.* 1.	2 63	0 5 3
„ grains of (Guinea grains) - -	„	3 *a.*	8 0	0 16 0
Paraffine (a chemical product from tar) -	VI.	22 *b.*	1 50	0 3 0
„ candles - - - - -	XX.	77 *b.*	5 25	0 10 6
Parasols, Japanese (Chinese), made from a common bamboo-cane and paper	XVI.	64 *d.* 2.	6 0	0 12 0
„ of textures - - -	XIX.	75 *b.*	75 0	7 10 0
Parchment, coloured - - -	XV.	62 *b.* 1.	7 50	0 15 0
„ uncoloured - - -	„	62 *b.* 3.	3 0	0 6 0
„ goods - - - -	„	62 *d.* 3.	10 50	1 1 0
Parisian blue - - - - -	XX.	76 *d.* 1.	5 0	0 10 0
Partridges - - - - -	IV.	16 *c.*	Free.	
Paste, imitation stones - - -	VIII.	32 *c.*	0 80	0 1 7½
„ not set. *See* Glassy flux - -	XVI.	65 *d.* 1.	6 0	0 12 0
„ work - - - - -	XIV.	60 *g.* 2.	6 0	0 12 0
„ (also carton-pierre) - - -	„	60 *a.* 1.	Free.	
„ board - - - - -	„	„	Free.	

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Pastes (impressions of coins, &c.). *See* Impressions.				
„ medicinal	XX.	76 *a.*	15 0	1 10 0
Pastry (meat pies)	VII.	28 *e.* 1.	10 0	1 0 0
Patchouli	IX.	33 *a.* 1.	5 25	0 10 6
Patent wood (fibrous puffs, carton-pierre), for roofings, wainscotings, casings for steam boilers	XIV.	60 *a.* 1.	Free.	
„ „ manufactures	„	60 *g.* 2.	6 0	0 12 0
„ wool, made from chemically prepared flax, or from the plant called Chorchorus capsularis (also Natta jute)	XI.	46	Free.	
„ „ from remains of cotton or cotton stuffs	XII.	49	5 25	0 10 6
„ „ from remains of sheep wool or other woollen stuffs	„	51	0 75	0 1 6
Patterns. *See* Preface to Customs' Tariff.				
Peaches, fresh	III.	9 *a.*	Free.	
„ dried, parched, cut up in pieces, not jams made of them, boiled in sugar or otherwise prepared	„	9 *b.* 2.	0 80	0 1 7½
	VII.	28 *e.* 1.	10 0	1 0 0
„ kernels of	III.	13 *e.* 2.	Free.	
Peacocks' feathers, not prepared	V.	18 *d.*		
„ „ prepared	XIX.	75 *b.* 1.	75 0	7 10 0
Pearls in mussels	VIII.	31 *a.* 2.	Free.	
„ real, mounted	XIX.	75 *a.*	75 0	7 10 0
„ „ not mounted	XVI.	66 *a.*	12 0	1 4 0
„ imitation (wax-pearls, paste), copied from the real ones in glass filled out with wax-pearl essence, and other similar imitations	XIX.	75 *b.* 2.	50 0	5 0 0
Note.—Pearls on bands in a row are not considered as mounted.				
Pearl, mother of, rough, or only cut	VIII.	31 *a.* 2.	Free.	
„ „ goods	XVI.	63 *b.* 2.	6 0	0 12 0
Pears, fresh	III.	9 *a.*	Free.	
„ dried, parched, cut up; also jams made of them, stewed without sugar	„	9 *b.* 2.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
Peas. *See* Vegetables.				
Peat	VIII.	30 *a.*	Free.	
„ ash	XXII.	80 *b.*	Free.	
„ coal	VIII.	30 *a.*	Free.	
Pegs, wooden	XVI.	64 *a.*	Free.	
Pen-holders	-	-	According to quality of material.	
Pen-knives	-	-	According to quality of material.	
Pens, writing	XVII.	69 *c.* 1.	15 0	1 10 0
Pepper (as well as pepper dust), long, red (Spanish cayenne), white, black	I.	3 *a.*	8 0	0 16 0
„ cake (gingerbread)	VII.	28 *e.* 1.	10 0	1 0 0
„ mint plants	III.	13 *h.* 1.	0 80	0 1 7½
„ stems of plant	VIII.	31 *a.* 1.	Free.	

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Perambulators, with leather and upholstery work, under 50 zollpfund	XVI.	64 *d.* 1.	12 0	1 4 0
without upholstery or leather-work under 50 zollpfund, with hood made of oilcloth, and strips of woollen goods fixed on for protection against the sun light -	„	64 *d.* 2.	6 0	0 12 0
Perfumery materials - - - (*See* note to ethereal oils.)	IX.	33 *b.* 2.	5 0	0 10 0
„ goods - - - - (*See* note to Chemical Products, superior.)	XX.	76 *c.* 2.	12 0	1 4 0
Periodicals and newspapers (subject to stamp duty) - -	XXI.	79 *b.*	Free.	
Perspectives (telescopes) - - -	XIX.	73 *b.*	Free.	
Petrifactions, rough - - -	VIII.	32 *a.* 1.	Free.	
„ polished - - -	„	32 *c.* 1.	0 80	0 1 $7\frac{1}{2}$
Petroleum, same as white-rock oil.				
Pheasants - - - - -	IV.	16 *c.*	Free.	
Phosphorus - - - -	XX.	76 *d.* 1.	5 0	0 10 0
Phosphoric acid - - - -	„	„	5 0	0 10 0
Phosphoride—*i.e.* phosphate of lime, for producing artificial manure	VIII.	32 *a.* 1.	Free.	
Photographs (photographic pictures on paper) without frame -	XXI.	79 *b.*	Free.	
„ with frame - - -	- -	- -	According to quality of material.	
Pianos - - - - - -	XIX.	73 *a.*	3 0	0 6 0
„ key-boards for - - -	„	„	3 0	0 6 0
„ „ pieces of wood belonging to (hammers) roughly prepared -	XVI.	64 *a.*	Free.	
Pickles, mixed - - - -	VII.	28 *e.* 1.	10 0	1 0 0
Picture-books, printed on cotton or linen stuffs for children -	XXI.	79 *a.*	Free.	
Pictures on paper, also picture sheets and lithographs, perforated like lace (lace pictures), moveable pictures (*i.e.* with separate figures, arranged to be pulled or moved by means of iron wire, glue or paste), with figures cut out and pasted on; further perforated pictures, capable of being taken to pieces - - -	„	79 *b.*	Free.	
„ bound, or printed with the text -	„	79 *a.*	Free.	
„ „ but not with the text -	„	79 *b.*	Free.	
„ made after the fashion of oil paintings, varnished and pasted on linen stretched on a frame of wood - - - -	„	79 *c.*	Free.	
„ on paper, with frame and glass -	XIV.	60 *g.* 2.	12 50	1 5 0

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			fl. kr.	£ s. d.
Pictures, of other materials	- -	- -	According to their quality.	
„ sheets of, entire or cut up, laid over with gold or silver leaf	XIV.	60 *d.* 1.	6 0	0 12 0
Pigeons	IV.	16 *c.*	Free.	
Pigs	„	15 *f.*	1 5	0 2 1¼
Pig's-grease	VI.	22 *a.* 1.	2 63	0 5 3
„ „ mixed with tallow	„	„	2 63	0 5 3
„ „ „ „ from Moldavia	„	22 *d.* 1.	0 80	0 1 7½
Pigskins, raw	V.	17 *a.*	Free.	
Pillars, and their component parts, of stone:—				
Polished, over 10 pounds	XVI.	66 *b.* 2.	0 75	0 1 6
„ under „	„	66 *c.*	6 0	0 12 0
Not polished	VIII.	32 *a.* 1.	Free.	
Pills, medicinal	XX.	76 *a.*	15 0	1 10 0
Pimento, (Jamaica pepper, new spice)	I.	3 *a.*	8 0	0 16 0
Pineapples	„	5 *a.* 3.	Free.	
Pine cones, empty	III.	13 *c.*	Free.	
„ „ with core	I.	5 *a.* 2.	2 50	0 5 0
Pinion wire (for watchmakers)	X.	40 *h.*	4 0	0 8 0
Pipes, leaden	„	39 *b.* 2.	2 50	0 5 0
„ cast-iron, rough (also together with the connexions)	„	40 *i.* 1.	0 60	0 1 2½
„ wrought-iron (also together with the connexions)	XVII.	69 *a.* 4.	1 25	0 2 6
„ zinc	X.	42 *b.* 1.	1 50	0 3 0
„ tin	„	43 *b.*	2 0	0 4 0
„ of paper and asphalt, also with iron joints or coils serving as a connexion to the separate parts	XIV.	60 *a.* 1.	Free.	
„ cast, of copper, brass	X.	43 *c.* 2.	3 0	0 6 0
„ grooved, of copper, brass	XVII.	70 *c.* 2.	6 0	0 12 0
„ cast, grooved, of copper or brass, when they figure as machines	XIX.	74 *d.*	4 0	0 8 0
„ wooden	XVI.	64 *a.*	Free.	
„ stone, unhewn	VIII.	32 *a.*	Free.	
„ *others*	- -	- -	According to quality of material.	
„ musical, wooden	XIX.	73 *b.*	Free.	
„ „ as a plaything	XVI.	64	Free.	
„ tobacco	- -	- -	According to quality of material.	
„ clay, white	VIII.	32 *b.*	Free.	
Pistols (weapons)	XVII.	69 *c.* 1.	15 0	1 10 0
Pitch, white, yellow, black	IX.	35 *a.*	Free.	
„ coloured (bottle pitch, tinker's pitch)	XX.	76 *d.* 1.	5 0	0 10 0
„ torches	„	77 *d.*	0 75	0 1 6
„ oil	IX.	35 *c.* 2.	0 75	0 1 6
„ sediment (remains in the production of pitch)	„	35 *a.*	Free.	
„ quick-matches made of. *See* Matches.				
Plaids, woollen, milled	XIII.	54 *b.* 1.	15 0	1 10 0
„ buckskin	„	„	15 0	1 10 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Plaisters, pharmaceutical	XX.	76 *a.*	15 0	1 10 0
Plaits	III.	13 *c.*	Free.	
Planes, and plane-irons	XVII.	69 *b.* 1.	4 0	0 8 0
Planing machines	XIX.	74 *c.*	2 0	0 4 0
Plantains (bananas)	I.	5 *b.* 1.	2 63	0 5 3
Plants not specially named	III.	13 *h.* 1.	0 80	0 1 7½
,, paper made from, of the stems and ribs of tobacco leaves	II.	8 *b.*	26 25	2 12 6
,, paper made from, East Indian	XX.	76 *a.*	15 0	1 10 0
,, juices of, not specially named, *i.e.*, such as have not been artificially produced nor extracted by boiling or pressing, but exude of themselves, or those which are obtained by sapping and such-like simple means, and a further preparation of which has not taken place, nor contain an addition of other ingredients	IX.	35 *d.* 2.	0 80	0 1 7½
,, juices from, fermented, fluid	VII.	27	4 0	0 8 0
,, ,, ,, fermented and made to resemble a spirituous fluid	XX.	76 *d.* 1.	5 0	0 10 0
,, ,, ,, mixed with sugar, honey, syrup	VII.	28 *e.* 1.	10 0	1 0 0
,, parts of, not specially named	III.	13 *h.* 1.	0 80	0 1 7½
Plastic coal. *See* Gas coal.				
Plated (silvered over) sheets, wires, tablets, and plates	XVII.	70 *c.* 2.	6 0	0 12 0
,, goods	XIX.	75 *b.* 3.	25 0	2 10 0
Plates (sheets), of horn, bone, rough, only cut	VIII.	31 *a.* 1.	Free.	
,, of ivory, rough, only cut	,,	31 *a.* 2.	Free.	
,, ,, stone, cut, polished	,,	32 *c.* 1.	0 80	0 1 7½
,, stereotype	X.	39 *b.* 1.	2 50	0 5 0
,, of cork	XVI.	64 *b.*	0 75	0 1 6
,, ,, lead	X.	39 *b.* 2.	2 50	0 5 0
,, ,, ,, punched	XVII.	68. 3.	4 0	0 8 0
,, cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
,, (iron and steel) rough, unpolished	,,	40 *e.* 1.	2 0	0 4 0
,, ,, ,, polished, tinned, galvanised, varnished, covered over with lead	,,	40 *f.* 1.	4 0	0 8 0
,, ,, ,, coppered drilled, punched	XVII.	69 *a.* 1.	4 0	0 8 0
,, zinc (also engraved)	X.	42 *b.* 1.	1 50	0 3 0
,, ,, punched	XVII.	70 *c.* 3.	4 0	0 8 0
,, tin	X.	43 *b.*	2 0	0 4 0
,, ,, punched	XVII.	70 *c.* 3.	4 0	0 8 0
,, of base metals (also engraved, etched)	X.	43 *c.* 2.	3 0	0 6 0
,, ,, ,, punched	XVII.	70 *c.* 3.	4 0	0 8 0
,, ,, ,, if they figure as machines	XIX.	74 *d.*	4 0	0 8 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Plates, copper, brass, plated (silvered over)	XVII.	70 *c.* 2.	6 0	0 12 0
„ (Bunsen's) or cylinders for electric batteries of ground coke worked up with coal tar	XIX.	73 *b.*	Free.	
„ others	- -	- -	According to quality of material.	
Platina, raw, also old, broken	X.	44 *c.*	0 80	0 1 7½
„ sheets and wire	XIX.	75 *b.* 1.	75 0	7 10 0
„ spongy	X.	44 *c.*	0 80	0 1 7½
„ goods	XIX.	75 *b.* 1.	75 0	7 10 0
Playing cards, are subject to stamp duty	XIV.	60 *f.*	31 50	3 3 0
Playthings, according to the quality of the material. *See* Children's Playthings.				
Ploughs, iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ coulters for	„	„	2 0	0 4 0
Ploughshares	X.	40 *g.* 1.	1 75	0 3 6
Plumes, prepared	XIX.	75 *b.* 1.	75 0	7 10 0
„ not prepared	V.	18 *d.*	Free.	
Plums, fresh	III.	9 *a.*	Free.	
„ dried, parched, cut up, not jams made of them and boiled in sugar	„	9 *b.* 2.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
„ kernels of	III.	13 *e.* 2.	Free.	
Plush, stuff in which the pile is produced by distinct threads of the texture — cotton	XIII.	52 *b.* 3.	30 0	3 0 0
— woollen	„	54 *c.* 2.	35 0	3 10 0
— silk	„	55 *b.* 2.	60 0	6 0 0
Pocket Books. *See* Letter Cases.				
Poil-de-chevre (Angora hair, woollen stuff)	„	54 *a.*	4 50	0 9 0
Poles, wooden	„	29 *b.*	Free.	
„ zinc	X.	42 *b.* 2.	0 75	0 1 6
„ tin	„	43 *b.*	2 0	0 4 0
„ of other base metals	„	43 *c.* 2.	3 0	0 6 0
Polishers, combined with tanned or only blackened leather	XV.	62 *c.*	6 0	0 12 0
„ combined with other leather	„	62 *d.* 3.	10 50	1 1 0
„ „ paper	XIV.	60 *g.* 2.	6 0	0 12 0
Polishing wax (wax, colophony, and oil of turpentine)	XX.	76 *d.* 1.	5 0	0 10 0
Polishes	„	76 *c.* 1.	15 0	1 10 0
Pomegranates	I.	5 *b.* 2.	2 50	0 5 0
„ blossoms of	IX.	33 *a.* 1.	5 25	0 10 6
„ peel of	III.	13 *h.* 1.	0 80	0 1 7½
Poplins, silk	XIII.	55 *a.*	80 0	8 0 0
Poppy seeds	III.	13 *e.* 2.	Free.	
„ capsules of, empty	„	13 *c.*	Free.	
Porcelain, white, also with coloured borderings	XV.	67 *c.* 2.	2 50	0 5 0
„ coloured, painted, impressed, gilt, plated, or in combination with materials not coming under the category of petty or hardwares	XVI.	67 *d.* 2.	6 0	0 12 0
Portable soups	VII.	28 *e.* 1.	10 0	1 0 0
Portfolios. *See* Maps.				

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Post-horns	XIX.	73 *a.*	3 0	0 6 0
Potash (carbonate of, in a raw condition) *See also* Kali.	IX.	37 *a.*	Free.	
„ preparations of	XX.	76 *d.* 1.	5 0	0 10 0
„ prussiate of *See* Kali.	IX.	37 *f.* 2.	1 50	0 3 0
Potatoes, fresh	III.	9 *a.*	Free.	
Pots, leaden	XVII.	68. 3.	4 0	0 8 0
„ iron, tinned	„	69 *a.* 1.	4 0	0 8 0
„ „ enamelled	„	69 *b.* 1.	4 0	0 8 0
„ zinc	„	70 *a.* 1.	4 0	0 8 0
„ of other base metals	„	70 *b.*	4 0	0 8 0
„ as utensils (crockery ware) of common clay	XVI.	67 *a.*	0 25	0 0 6
Potters' clay (common)	VIII.	32 *a.* 3.	Free.	
Pottery-wares, of common clay with or without glazing	XVI.	67 *a.*	0 25	0 0 6
Powder, medicinal	XX.	76 *a.*	15 0	1 10 0
„ perfumed	„	76 *c.* 2.	12 0	1 4 0
„ gun	„	78 *c.*	26 25	2 12 6
„ soap	„	77 *f.*	5 0	0 10 0
„ flasks, „ horns, „ measures	according to the quality of the material.			
Precious Stones, rough	VIII.	32 *a.* 1.	Free.	
„ „ polished, mounted	XIX.	75 *a.*	75 0	7 10 0
„ „ polished, not mounted	XVI.	66 *a.*	12 0	1 4 0
Preparations, chemical and pharmaceutical (in so far as the latter do not belong to medicinal wares)	XX.	76 *d.* 1.	5 0	0 10 0
Press cloths (filtering cloths), woollen	XIII.	54 *a.*	4 50	0 5 0
Presses, wooden	XVI.	64	Free.	
„ iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ steam-printing	XIX.	74 *a.*	1 0	0 2 0
„ others	- -	- -	According to quality of material.	
Prices-current, printed, lithographed, as prepared paper	XIV.	60 *c.*	1 50	0 3 0
„ „ not filled out, printed	XXI	79 *a.*	Free.	
Protractors, for measuring angles by degrees and minutes	XIX.	73 *b.*	Free.	
Pumice-stone, natural and artificial, rough	VIII.	32 *a.*	Free.	
„ „ ground, mashed, shaped	„	32 *c.* 2 *a.*	0 75	0 1 6
„ „ paper, cloth	„	„	0 75	0 1 6
Pumpernickel (black rye-bread, a corruption of "bon pour Nickel," this being the name of a favourite horse which was fed with it)	VII.	28 *a.* 1.	0 80	0 1 7½
„ as confectionary	„	28 *e.* 1.	10 0	1 0 0
Pumps, air	XIX.	73 *b.*	Free.	
„ water-syringes, fire-engines	„	74 *a.*	1 0	0 2 0
„ iron (water-pumps for use, in kitchens, for instance)	„	„	1 0	0 2 0

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Punch essence	VII.	26 *b.*	15 0	1 10 0
Purging-grains (granillo grains)	III.	13 *h.* 1.	0 80	0 1 7½
Purses	-	-	According to quality of material.	
Putty, of all kinds	XX.	76 *d.* 1.	5 0	0 10 0
Pyrotechnical substances	,,	,,	5 0	0 10 0
Q.				
Quadrants	XIX.	73 *b.*	3 0	0 6 0
Quarry stones, rough	VIII.	32 *a.*	Free.	
Quassia wood, and bark	III.	13 *h.* 1.	0 80	0 1 7½
Quick grass (quitch-grass, knot, or dog-grass)	,,	,,	0 80	0 1 7½
,, **matches** (also worked hollow) steeped in pitch, and filled with a small quantity of powder	XX.	78 *a.*	Free.	
Quicksilver	X.	41	Free.	
,, preparations of	XX.	76 *d.* 1.	5 0	0 10 0
Quill pens, rough	V.	18 *d.*	Free.	
,, prepared	,,	18 *e.*	Free.	
Quilting and fustian (dimity) quilting	XIII.	52 *a.* 1.	16 0	1 12 0
Quinces, fresh	III.	9 *a.*	Free.	
,, dried, parched, cut up, and jams made of them without sugar	,,	9 *b.* 2.	0 80	0 1 7½
,, cheese, bread, and marmalade made from	VII.	28 *e.* 1.	10 0	1 0 0
Quinine	XX.	76 *d.* 1.	5 0	0 10 0
R.				
Rabbits (also skinned)	IV.	16 *c.*	Free.	
Rabbit-skins, raw	V.	17 *a.*	Free.	
Racahout des Arabes (a mixed nourishment for invalids, in the form of a drink)	VII.	28 *e.* 1.	10 0	1 0 0
Radishes	III.	9	Free.	
Rags (also softened first stuffs)	XXII.	80 *c.*	Free.	
Rails (railway)	X.	40 *c.*	1 25	0 2 6
Railway trucks, crossings for (so-called tongues or frogs)	,,	40 *i.* 2.	0 60	0 1 2½
,, carriages	XVIII.	72 *d.*	10 per cent. ad val.	
,, ,, under 50 centners	XIX.	74 *h.*	1 33	0 2 7½
,, ,, buffers for, already turned, without connexions	XVII.	69 *a.* 3.	2 0	0 4 0
,, ,, wheels for, on axles, of wrought iron or steel	,,	,,	2 0	0 4 0
,, ,, brakes for, door fittings, and other parts	,,	,,	2 0	0 4 0
,, ,, bed-plates ,, ,, fish-plates	,,	,,	2 0	0 4 0

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			fl. kr.	£ s. d.
Raisins	I.	5 *a.* 2.	2 50	0 5 0
Rakes, wooden	XVI.	64 *a.* 1.	Free.	
„ iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ others	-	-	According to quality of material.	
Rams	IV.	15 *d.*	0 27	0 0 6½
Rape oil	VI.	23	5 0	0 10 0
„ seed	III.	13 *e.* 2.	Free.	
„ yellow	„	„	Free.	
Rapiers, iron (weapons)	XVII.	69 *c.* 2.	6 0	0 12 0
Rasps, iron	„	69 *b.* 1.	4 0	0 8 0
Raw steel, in blocks	X.	40 *d.* 2.	0 75	0 1 6
„ sugar	I.	7 *c.*	9 45	0 18 11
Razors, not polished, combined with wood	XVII.	69 *c.* 3.	4 0	0 8 0
„ polished, or in other combinations	„	69 *c.* 2.	6 0	0 12 0
„ with tortoiseshell handles	XIX.	75 *c.* 2.	25 0	2 10 0
Red (reddle, red chalk), rough, cut	VIII.	32 *b.*	Free.	
„ chalk after washing, formed into sticks and crayons in wood or reed	XX.	76 *c.* 3.	6 0	0 12 0
„ crayons, not in wood or reed	„	76 *e.* 2.	12 0	1 4 0
„ **wood** (Brinas, Brazil, Costarica, Pernambuco, Japan)	IX.	34 *a.*	Free.	
„ „ (St. Martha, Martins, or Japan-wood). *See* Dyewoods.				
„ „ extract of	„	34 *g.* 1.	1 50	0 3 0
Reeds	III.	13 *c.*	Free.	
„ iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ wicker-work of } for domestic use „ goods made of } for domestic use	XIV.	59 *c.* 1.	2 50	0 5 0
Regulus of antimony	IX.	37 *a.*	Free.	
Reindeer hides, raw	V.	17 *a.*	Free.	
Retorts	-	-	According to nature of material.	
Revalenta Arabica	I.	4. 1.	0 75	0 1 6
Rhinoceros hides, raw	V.	17 *a.*	Free.	
Rhubarb roots	IX.	33 *a.* 1.	5 25	0 10 6
„ white	III.	13 *h.* 1.	0 80	0 1 7½
Ribbons, cotton	XIII.	52 *b.* 3.	30 0	3 0 0
„ linen	„	53 *e.*	40 0	4 0 0
„ woollen	„	54 *c.* 2.	35 0	3 10 0
„ silk	„	55 *a.*	80 0	8 0 0
„ others	-	-	According to nature of material.	
Rice, husked	III.	11 *a.*	0 25	0 0 6
„ in the husk	„	11 *b.*	Free.	
„ flour	„	12	0 80	0 1 7½
„ straw brushes	XIV.	59 *a.*	0 25	0 0 6
Riding equipments, with buckles and rings of precious metals, or of base metals, real gilt or plated	XV.	62 *d.* 1.	25 0	2 10 0
„ in other combinations	„	62 *d.* note 2.	10 50	1 1 0

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Riding equipments, of common leather -	XV.	62 *c.*	6 0	0 12 0
„ „ of superior leather - *See* Saddlery.	„	62 *d.* 3.	10 50	1 1 0
Rifles (fire-arms) - - - -	X VII.	69 *c.* 1.	15 0	1 10 0
Rigging, old - - - -	XXII.	80 *c.*	Free.	
Rings, iron, coarse - - - -	XVII.	69 *a.* 3.	2 0	0 4 0
„ other - - - -	- -	- -	According to nature of material.	
Rock oil, black - - - -	IX.	35 *b.* 1.	Free.	
„ „ white and red, natural - -	„	35 *c.* 1.	0 75	0 1 6
„ „ „ „ produced by dry distillation of coal, and serving for lighting purposes - -	„	„	0 75	0 1 6
„ **salt** - - - - -	IX.	36	0 42	0 0 10
Roes, alive and dead - - -	IV.	16 *a.*	1 58	0 3 2
„ hair, raw - - - -	V.	18 *b.*	Free.	
„ hides, raw - - - -	„	17 *a.*	Free.	
Ropemakers' goods (linen), bleached -	XIII.	53 *b.*	0 75	0 1 6
„ „ „ unbleached -	„	53 *a.*	0 75	0 1 6
Ropes, linen, unbleached - - -	„	„	0 75	0 1 6
„ „ bleached - - -	„	53 *b.*	0 75	0 1 6
„ coarse, of cotton - - -	„	52 *a* 2.	12 0	1 4 0
„ „ horsehair, without further combinations - -	„	54 *a.*	4 50	0 9 0
„ „ other woven or textile materials. *See* Lacework.				
„ old - - - - -	XXII.	80 *d.*	Free.	
Rose blossoms - - - -	IX.	33 *a*, 1.	5 25	0 10 6
„ **wreaths** (garlands of roses) -	- -	- -	According to nature of material.	
„ **oil,** and „ **water** } and according to nature of receptacle, or labels - }	„	33 *b.* 2.	5 0	0 10 0
	XX.	76 *c.* 2.	12 0	1 4 0
Rosemary oil - - - -	IX.	33 *a.* 2.	3 0	0 6 0
Rosin, common - - - -	„	35 *a.*	Free.	
„ other kinds of. *See* Gums.				
„ **oil** (produced by distilling colophony) - - - -	„	35 *c.* 2.	Free.	
Rosoglio (a liqueur) - - -	VII.	26 *b.*	15 0	1 10 0
Rouge goods - - - -	XIII.	52 *b.* 3.	30 0	3 0 0
Round iron } under ½ Vienna inch in diameter. *See* Wire. „ **steel** }				
Rubies. *See* Precious Stones.				
Rum - - - - -	VII.	26 *a.*	9 0	0 18 0
„ **ether** - - - -	XX.	76 *d.* 1.	5 0	0 10 0
„ **essence** - - - -	VII.	26 *a.*	9 0	0 18 0
Rupture bands, of woven or textile materials - - -	XIII.	57 *a.* 1.	25 0	2 10 0
„ others - - -	- -	- -	According to nature of material.	
Rye - - - - -	III.	10 *b.*	0 27	0 0 6½

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
S.				
Sabres. *See* Swords.				
Saccharic acid (oxalic acid)	IX.	37 *f.* 1.	fl. kr. 2 0	£ *s.* *d.* 0 4 0
Sacks, linen, made of grey packing canvas	XIII.	53 *b.*	0 75	0 1 6
„ „ made of grey packing canvas, artificially sewn, or with foreign material	„	57 *a.* 1.	25 0	2 10 0
See Preface to Customs' Tariff.				
Saddlery, of tanned, red tanned, or only blackened leather, or of hairy skins	XV.	62 *c.*	6 0	0 12 0
„ with buckles and rings of precious metals, or of real or imitation gilt or plated base metals	„	62 *d.* 1.	25 0	2 10 0
„ of coloured lacquered leather, leather cloth, superior oil-cloth	„	62 *d.* 3.	10 50	1 1 0
„ of inferior unprinted oil-cloth, grey packing canvas, sail-cloth, rough drill, and huckaback	„	62 *d.* 4.	6 0	0 12 0
NOTE.—All these goods also combined with materials not coming under the category of fancy or hard wares.				
See Horse harness.				
Saddles. *See* Riding Equipments.				
„ equipments of. *See* Saddlery.				
Saddletrees, wooden	XVI.	64 *a.*	Free.	
Saffower	IX.	34 *d.*	Free.	
„ extract of	„	34 *g.* 1.	1 50	0 3 0
„ (paste) carmine	XX.	76 *d.* 1.	5 0	0 10 0
Saffron	I.	3 *b.*	15 0	1 10 0
Sago and its surrogates	„	4. 1.	5 25	0 10 6
Sail cloth (canvas) of linen, unbleached	XIII.	53 *c.* 1.	6 0	0 12 0
Sailors' cloth (Sigona)	„	54 *a.*	4 50	0 9 0
Sal ammoniac (*i.e.*, carbonate and sulphuret of ammoniac)	IX.	37 *e.* 2.	0 75	0 1 6
„ spirit of	„	„	0 75	0 1 6
Salep root	„	33 *a.* 1.	5 25	0 10 6
Salt (common, rock, and bay salt)	„	36	0 42	0 0 10
See also Preface to Customs' Tariff.				
„ for manure	XXII.	80 *a.*	Free.	
Saltpetre (kali saltpetre, nitrate of soda), raw	IX.	37 *a.*	Free.	
„ „ „ refined	„	37 *d.* 1.	0 75	0 1 6
„ (spirit of nitre, aqua fortis)	„	37 *c.* 2.	0 25	0 0 6
Salts, smelling	„	37 *e.* 2.	0 75	0 1 6
Salves	XX.	76 *a.*	15 0	1 10 0
Sand (for building purposes, moulding, and liquid sand)	VIII.	32 *a.* 1.	Free.	
„ **paper,** for polishing	„	32 *c.* 2.	0 75	0 1 6
„ **glasses** (hour glasses)	XVI.	65	0 75	0 1 6

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Sandal-wood, red	VIII.	29 *c.*	Free.	
,, yellow (amber wood), white, blue	III.	13 *h.* 1.	0 80	0 1 7½
Santorine clay (raw cement for walls)	VIII.	32 *a.* 1.	Free.	
Sap-green	XX.	76 *d.* 1.	5 0	0 10 0
Sapphires. *See* Precious Stones.				
Sardines, in cases	VII.	28 *e.* 1.	10 0	1 0 0
Sarsaparilla roots	IX.	33 *a.* 1.	5 25	0 10 6
Sassafras wood	III.	13 *h.* 1.	0 80	0 1 7½
Satchels, hunting, and travelling bags, leather	XV.	62 *a.* 4.	3 0	0 6 0
,, of straw	XIV.	59 *c.* 1.	2 50	0 5 0
,, ,, with silk or other spinnings or horsehair woven in	,,	59 *e.*	25 0	2 10 0
,, ladies, of woven or textile stuffs, sewn or made up	XIII.	57	25 0	2 10 0
,, netted, knitted, worked	- -	- -	According to nature of material.	
Satin cloth, printed	,,	54 *d.*	35 0	3 10 0
,, not printed	,,	54 *b.* 1.	15 0	1 10 0
Sawdust	XXII.	80 *b.*	Free.	
Sauces	VII.	28 *e.* 1.	10 0	1 0 0
Sawblades and saws	XVII.	69 *b.* 1.	4 0	0 8 0
,, ,, (disc, circular)	XIX.	74 *c.*	2 0	0 4 0
,, ,, those which cannot be used without being combined with other parts, nor without extraneous motive power	,,	,,	2 0	0 4 0
,, ,, articles made by, timbers, rough, and prepared	VIII.	29 *b.*	Free.	
Sausages (meat)	V.	19 *c.*	8 0	0 16 0
,, consisting of a mixture of salted meat, bacon, and pease (so-called pease-sausages, "Erbsenwürste") in skins	,,	,,	8 0	0 16 0
,, in paper coverings, or packed in tin foil	,,	19 *b.*	1 50	0 3 0
,, other kinds of	VII.	28 *e.* 1.	10 0	1 0 0
Scales, made of copper, brass	XVII.	70 *c.* 2.	6 0	0 12 0
,, others	- -	- -	According to nature of material.	
Scarifiers (cupping instruments)	XIX.	73 *b.*	Free.	
,, (cups)	,,	,,	Free.	
Scented water	XX.	76 *c.* 2.	12 0	1 4 0
Schweinfurt, green	,,	76 *d.* 1.	5 0	0 10 0
Scissors, iron, rough (tailors' snips), unpolished, unlacquered	XVII.	69 *b.* 1.	4 0	0 8 0
,, iron, superior, ground, varnished	,,	69 *c.* 3.	4 0	0 8 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Scissors, iron, superior, polished, lacquered, or combined with materials not coming under the category of petty or hard wares	XVII.	69 *c.* 2.	6 0	0 12 0
„ for cutting out, common	XVI.	68 *b.* 1.	15 0	1 10 0
Scouring balls and tincture	XX.	76 *d.* 1.	5 0	0 10 0
Scrapers (*i.e.*, cards for carding wool), of all descriptions (of gummed cotton straps or tanned leather)	XVII.	69 *c.* 3.	15 0	1 10 0
„ with iron pegs	„	69 *c.* 2.	6 0	0 12 0
„ with brass pegs	„	70 *c.* 1.	15 0	1 10 0
Scratch-brushes (wire brushes) of iron wire (for metal workers)	„	69 *b.* 1.	4 0	0 8 0
„ brass	„	70 *c.* 2.	6 0	0 12 0
Screens (shades), Chinese, made of paper	XIV.	60 *g.* 2.	6 0	0 12 0
„ made of woven or textile goods	XIX.	75 *b.*	75 0	7 10 0
„ others	-	-	According to nature of material.	
Screws, wooden, rough	XVI.	64 *a.*	Free.	
„ iron, rough (also pianoforte and Zither screws)	XVII.	69 *b.* 2.	3 50	0 7 0
„ others	-	-	According to nature of material.	
„ nut and bolts	„	69 *a.* 3.	2 0	0 4 0
Sculptors' and statuary work, of stone	XVI.	66	12 0	1 4 0
„ „ „ of wood	„	64 *d.* 2.	6 0	0 12 0
„ „ „ of bone	„	63 *b.*	15 0	1 10 0
Scythes	XVII.	69 *b.* 3.	2 0	0 4 0
Sea water-lily roots, white (henuphar)	IX.	34 *a.* 2.	Free.	
„ **weed**	XI.	46	Free.	
„ „ goods made of, for domestic use. *See* Straw Goods.				
Sealing-wax	XX.	76 *d.* 1.	5 0	1 10 0
Seals (signets)	-	-	According to nature of material.	
Sealskin, not worked with a double warp	XIII.	54 *b.* 1.	15 0	1 10 0
Seeds, not mentioned in other sections of the tariff	III.	13 *h.*	0 80	0 1 7½
„ boiled down, crushed	XXII.	80 *b.*	Free.	
„ for agricultural and horticultural purposes	III.	13 *f.* 1.	0 27	0 0 6⅓
„ for medicinal use	„	13 *h.* 1.	0 80	0 1 7½
Sepia, raw, in vesicles (of the cuttle-fish)	IX.	34 *f.*	0 80	0 1 7½
Serpentine-stone (ophite)	VIII.	32	Free.	
„ work	XVI.	66 *b.* 2.	6 0	0 12 0
„ „ combined with other materials	„	66 *c.*	6 0	0 12 0
Sewing cushions, of cloth stuff. *See* stuffed (or padded) furniture.				
„ **machines**	XIX.	74 *b.*	1 33	0 2 7⅓
„ **needles.** *See* Needles.				
„ **silk.** *See* Silk.				
Shanks (of buttons) iron	XVII.	69 *c.* 2.	6 0	0 12 0

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Sharpening stones, rough	VIII.	32 *a.* 1.	Free.	
„ „ superior (also composition sharpening stones of powdered emery combined with tar for polishing metal goods):—				
in combination with other materials	XVI.	66 *c.*	6 0	0 12 0
not in combination	VIII.	32 *c.* 2.	0 75	0 1 6
Shavings	XXII.	80 *b.*	Free.	
Shawls (wrappers) of Cashmere or Thibet, with edgings, same as shawl cloths	XIII.	54 *e.* 2.	50 0	5 0 0
„ (cloths) with admixture of silk	„	55 *b.* 2.	60 0	6 0 0
„ „ „ without „ „	„	54 *e.* 2.	50 0	5 0 0
Shearings (waste from cloth shearing)	XI.	47 *a.*	Free.	
Sheath fish	IV.	14	Free.	
Sheep	„	15 *d. e.*	0 27	0 0 6½
Sheepskins, common, raw (also wethers, and skins of sheep which have died of a disease)	V.	17 *a.*	Free.	
„ whitened and coloured, not lined (angora)	XV.	61 *a.* 2.	4 50	0 9 0
„ partly tanned, dressed, not coloured, not further prepared	„	62 *a.* 5.	0 75	0 1 6
„ fleeces (skins), not lined	„	61 *a.* 2.	4 50	0 9 0
„ shears	XVII.	69 *b.* 1.	4 0	0 8 0
„ wool, raw (also combed, and in clippings)	XI.	74 *a.*	Free.	
„ wool, milled (also bleached, coloured)	„	47 *b.*	Free.	
Shellfish from the sea	IV.	14 *d.*	1 50	0 3 0
Ships, wooden	XVIII.	71 *a.*	0 42	0 0 10
„ iron (also made of zinc, or other base metals)	„	71 *b.*	5 25	0 10 6
„ wooden, as playthings	XVI.	64	Free.	
„ parts of, as models	- -	- -	According to nature of material.	
„ equipments of riggings	XVIII.	71	0 42	0 0 10
„ chains	X.	40 *g.* 1.	1 75	0 3 6
„ mills for	XVIII.	71 *a.*	0 42	0 0 10½
Mills and mill-sheds	- -	- -	According to nature of material.	
„ mills for, millworks	XIX.	74 *a.*	1 0	0 2 0
„ mills for, millworks (when they either consist entirely of wood, or only have such secondary parts, which are not to be taken into account) as wooden goods	XVI.	64 *a.*	Free.	
„ separate portions of millworks	- -	- -	According to nature of material, or as parts of machinery.	
„ ropes (cables), also tarred	XIII.	53 *a.*	0 75	0 1 6

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. a voirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Ships' biscuits	VII.	28 *a* 1.	0 80	0 1 7½
Shirts, sewn, cut out	XIII.	57 *a.* 1.	25 0	2 10 0
Shoemakers' goods, of tanned or only blackened leather from hairy skins	XV.	62 *c.*	6 0	0 12 0
„ „ of coloured lacquered leather, leather-cloth, superior oil-cloth	„	62 *d.* 3.	10 50	1 1 0
„ „ of inferior unprinted oil-cloth, grey packing canvas, sail-cloth (canvas), rough drill or huckaback	„	62 *d.* 4.	6 0	0 12 0
„ „ of woven and textile stuffs	„	62 *d.* 3.	10 50	1 1 0
NOTE.—All these goods likewise combined with materials not coming under the category of petty or hard wares.				
„ **lasts**	XVI.	64 *a.*	Free.	
Shoes, of common leather	„	62 *c.*	6 0	0 12 0
„ of woven and textile goods	„	62 *d.* 3.	10 50	1 1 0
„ entirely or partly of leather, leather-cloth, or india-rubber	„	„	10 50	1 1 0
„ of felt, or pieces of cloth combined with leather, leather-cloth, or india-rubber	„	62 *d.* 4.	6 0	0 12 0
„ parts of, of woven stuffs, cut out, and sewn	XIII.	57 *a.* 1.	25 0	2 10 0
Shots (leaden)	X.	39 *b.* 2.	2 50	0 5 0
„ leather bags for	XV.	62 *c.*	6 0	0 12 0
Shovels, wooden	XVI.	64 *a.*	Free.	
„ iron	XVII.	69 *a.* 3.	2 0	0 4 0
„ others	-	-	According to nature of material.	
Shrubs, for planting out	III.	13 *c.*	Free.	
Sickles	XVII.	69 *b.* 3.	2 0	0 4 0
Sieve, bottoms of, of wood	XIV.	58 *a.*	1 0	0 2 0
„ „ of horse-hair, not combined with other materials	XIII.	54 *a.*	4 50	0 9 0
„ „ of silk	„	55 *a.*	0 80	0 1 7½
„ „ in one piece, of common leather, uniformly perforated	XV.	62 *c.*	6 0	0 12 0
„ „ of iron or steel wire	XVII.	69 *c.* 2.	6 0	0 12 0
„ „ of brass wire	„	70 *c.*	15 0	1 10 0
Sievemakers' goods, of bristles	XIV.	58 *a.*	1 0	0 2 0
„ „ of other animal or vegetable stuffs	„	58 *b.* 2.	1 0	0 2 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Sievemakers goods, both, also combined with wood and iron, but neither stained, lacquered, varnished, coloured, nor polished, in other combinations, not coming under the category of petty or hard wares - - -	XIV.	58 *b.* 1.	6 0	0 12 0
Sieves, ready-made, wooden, with bottoms of woodwork or iron wire	„	58 *a.*	1 0	0 2 0
„ „ of perforated common leather - -	„	58 *b.* 1.	6 0	0 12 0
„ „ of horsehair - -	„	„	6 0	0 12 0
„ „ of wood or base metals, with bottoms of silk -	XIX.	75 *b.* 1.	75 0	7 10 0
Silk, raw, unthrown - - - -	XI.	48 *b.*	Free.	
„ „ „ in combination with raw woollen yarn -	XII.	51	0 75	0 1 6
„ thrown, not combined with other spinning materials - -	XI.	48 *d.* 2.	Free.	
„ „ combined with other spinning materials - - -	„	48 *d.* 1.	6 0	0 12 0
„ „ whitened or coloured, also combined with other spinning materials - - -	XI.	48 *f.* 1.	6 0	0 12 0
„ wastes, not spun - - -	„	48 *c.*	Free.	
„ „ spun, combined with other spinning materials - -	„	48 *e.* 1.	6 0	0 12 0
„ „ „ not combined with other spinning materials -	„	48 *e.* 2.	Free.	
„ „ „ coloured, also combined with other spinning materials - -	„	48 *f.* 2.	6 0	0 12 0
„ cocoons - - - - -	„	48 *a.*	Free.	
„ goods, of silk or flock silk alone -	XIII.	55 *a.* 1.	80 0	8 0 0
„ „ lace, silk lace (lace cloths and all embroidered woven goods) -	„	55 *a.* 2.	80 0	8 0 0
„ „ combined with metallic threads or spun glass - - -	„	55 *a.* 3.	80 0	8 0 0
„ „ half silk, *i.e.*, in which the warp (threads) or woof, taken either singly or together, consists for the most part of silk or flock silk - - -	„	55 *b.* 1.	60 0	6 0 0
„ „ shawls made of silk, wool, velvets, velveteens (feather shag), plushes, Barége, muslins, gauze, and other light textures -	„	55 *b.* 2.	60 0	6 0 0
„ „ ribbon, lace-work, and button-makers' goods -	„	55 *b.* 3.	60 0	6 0 0

(Items half silk, shawls, ribbon, lace-work, and button-makers' goods: in so far as all these goods are not included under 55 *a.*)

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Silk goods, combined with no matter what materials	XIX.	75 *b.* 1.	75 0	7 10 0
Silkworm gut (fish flare)	V.	21 *b.* 2.	0 80	0 1 7½
Silver, raw, old, broken and refined	X.	44 *b.*	Free.	
„ metal and foil	XIX.	75 *b.* 1.	75 0	7 10 0
„ spun, and work, genuine	„	75 *a.* 2.	75 0	7 10 0
„ „ imitation (galloon goods)	„	75 *c.* 2.	25 0	2 10 0
„ sweepings (dross)	XXII.	80 *b.*	Free.	
„ lac. *See* Gold Lac.				
„ paper	XIV.	60 *d.* 1.	6 0	0 12 0
„ goods. *See* Petty and Hard Wares.				
Sinews	XXII.	80 *b.*	Free.	
Size, gilding (ware, bolus-soap, and white of egg)	XX.	76 *d.* 1.	5 0	0 10 0
Skates, ground (finished off), only combined with wood	XVII.	69 *c.* 3.	4 0	0 8 0
„ polished, or in other combinations	„	69 *c.* 2.	6 0	0 12 0
Skids, iron	„	69 *a.* 3.	2 0	0 4 0
Skins. *See* Leather.				
Slate pencils, painted, coloured, covered over with paper, no matter of what kind, set in cane or unpolished or not lacquered wood	VIII.	32 *c.* 1.	0 80	0 1 7½
„ „ not painted or coloured, and not combined with other materials	„	32 *c.* 2.	0 75	0 1 6
„ „ set in polished or lacquered wood	XVI.	64 *c.*	1 50	0 3 0
„ „ gilt, plated, with imitation gold or silver leaf	„	66 *c.*	6 0	0 12 0
„ **oil,** mineral	IX.	35 *c.* 1.	0 75	0 1 6
„ „ obtained by distillation of bituminous slate. *See* Rock Oil.				
„ **paper** (also tablets made of it), not combined with other materials	VIII.	32 *c.* 2.	0 75	0 1 6
„ **tablets** of (also in wooden frames not polished or varnished)	„	„	0 75	0 1 6
„ „ in frames of polished or varnished wood	XVI.	64 *c.*	1 50	0 3 0
„ „ in other combinations	„	66 *c.*	6 0	0 12 0
Slates, rough, also in slabs	VIII.	32 *a.* 1.	Free.	
„ ground polished	„	32 *c.* 1.	0 80	0 1 7½
Sledges (sleighs)	XVIII.	72 *b.*	15 75	1 11 6
„ (hand sledges or sleighs)	XVI.	64 *a.*	Free.	
Slings, iron	XVII.	69 *c.* 2.	6 0	0 12 0
Slippers. *See* Shoes.				
Sloes, fresh	III.	9 *a.*	Free.	
„ dried, parched, jams made of them boiled down without sugar	„	9 *b.* 2.	0 80	0 1 7½
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
Smelting implements, of iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ utensils, of stone-ware	XVI.	67 *a.*	0 25	0 0 6
„ „ of silver or platina	XIX.	75 *b.* 1.	75 0	7 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Smelting crucibles, earthen, black	XVI.	67 *a.*	0 25	0 0 6
Smiths' utensils	XVII.	69 *a.* 3.	2 0	0 4 0
Snaffles	- -	- -	According to nature of material.	
Snails (slugs)	IV.	14 *a.*	Free.	
Soap, perfumed	XX.	77 *f.*	5 0	0 10 0
„ not perfumed	„	77 *e.*	3 0	0 6 0
„ Köhler's Extract of (extract for washing wool, a kind of soft soap in a pappy condition, dark brown in colour, and having a burnt smell)	„	„	3 0	0 6 0
Soapmakers' under-lye	„	76 *d.* 2.	0 40	0 0 10
Soap-roots (soap-wort)	III.	13 *h.* 1.	0 80	0 1 7½
Soda (plain carbonate of soda, Barilla, also calcined, crystallised)	IX.	37 *c.* 1.	0 40	0 0 10
„ caustic (raw, cerosine)	XX.	76 *d.* 1.	5 0	0 10 0
„ bi-carbonate of	IX.	37 *e.* 1.	1 50	0 3 0
Soles, felted. *See* Hair Soles.				
„ of cork-wood, trimmed with woven or textile stuffs	XVI.	64 *d.* 2.	6 0	0 12 0
Sounding-boards	„	64 *a.*	Free.	
Soups, portable	VII.	28 *e.* 1.	10 0	1 0 0
Spanish flies (cantharides)	IX.	33 *a.* 1.	5 25	0 10 6
Speaking trumpets	XIX.	73 *b.*	Free.	
Spectacles, mounted	„	75 *c.* 2.	25 0	2 10 0
„ not mounted (glasses only)	XVI.	65 *c.* 1.	4 0	0 8 0
„ with gold or silver rims	XIX.	75 *b.* 1.	75 0	7 10 0
Spelt, bearded wheat	III.	10	0 27	0 0 6½
Spelter (zinc)	X.	42	Free.	
Sperm (spermaceti)	VI.	22 *a.* 1.	2 63	0 5 2½
„ candles	XX.	77 *b.*	5 25	0 10 6
Spermaceti	VI.	22 *a.* 1.	2 63	0 5 2½
Spices, steeped in sugar, honey, oil, or otherwise	VII.	28 *e.* 1.	10 0	1 0 0
„ cloves	I.	3 *b.*	15 75	1 11 6
Spills, wooden	XVI.	64 *a.*	Free.	
Spindles, iron, ground	XVII.	69 *c.* 3.	15 0	1 10 0
„ iron, as parts of machinery	XIX.	74 *c.*	2 0	0 4 0
„ wooden	XVI.	64 *a.*	Free.	
Spinels. *See* Precious Stones.				
Spinning wheels, wooden	„	„	Free.	
„ **stuffs** (vegetable), raw, crisped, broken, combed, or in wastes	XI.	46	Free.	
Spirits, brandy	VII.	26 *a.* 1.	9 0	0 18 0
Spools (bobbins), iron, tinned	XVII.	69 *a.* 1.	4 0	0 8 0
„ wooden	XVI.	64 *a.*	Free.	
Spoons, wooden, coarse, uncoloured	„	„	Free.	
„ „ superior, also with carving	„	64 *d.* 2.	6 0	0 12 0
„ leaden, tin	XVII.	68. 2.	6 0	0 12 0
„ iron, also tinned	„	69 *a.* 1.	4 0	0 8 0
„ of other base metals	„	70 *c.* 2.	6 0	0 12 0
„ „ „ real gilt or plated	XIX.	75 *b.* 3.	25 0	2 10 0
„ of precious metals	„	75 *a.* 1.	75 0	7 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Spoons, others	-	-	According to nature of material.	
Springs, not specially named:				
„ (for stays, busks) of iron	XVII.	69 *c.* 2.	6 0	0 12 0
„ covered over with leather	XV.	62 *d.* 3.	10 50	1 1 0
„ (elastic), iron, galvanised, for furniture and mattresses	XVII.	69 *a.* 1.	4 0	0 8 0
„ for wigs	„	69 *c.* 2.	6 0	0 12 0
„ watch	„	69 *c.* 1.	15 0	1 10 0
„ „ of steel	„	„	15 0	1 10 0
„ iron, for locomotives or tenders	XIX.	74 *c.*	2 0	0 4 0
Spurs, iron, ground	XVII.	69 *c.* 3.	4 0	0 8 0
„ „ polished	„	69 *c.* 2.	6 0	0 12 0
„ others	-	-	According to nature of material.	
Stags	IV.	16 *a.*	1 58	0 3 2
„ hides of, raw	V.	17 *a.*	Free.	
Stalactite	VIII.	32 *a.* 1.	Free.	
Standards, with poles	XIX.	75 *b.*	75 0	7 10 0
„ without poles	XIII.	57	25 0	2 10 0
Starch	XX.	76 *b.* 1.	0 75	0 1 6
„ gum (dextrine)	„	76 *b.* 2.	Free.	
Statues, of stone, over 10 lbs in weight (including animal figures)	XVI.	66 *b.* 1.	Free.	
„ others	-	-	According to nature of material.	
Staves (of casks, staff wood), rough, prepared	VIII.	29 *b.*	Free.	
Steam apparatus for distilling purposes	-	-	According to nature of material.	
„ cylinders	XIX.	74 *b.*	1 33	0 2 7½
„ boilers, iron	„	74 *c.*	2 0	0 4 0
„ „ rivets for, rough, hammered	XVII.	69 *a.* 3.	2 0	0 4 0
„ „ tubes for (parts of machinery) of iron	XIX.	74 *c.*	2 0	0 4 0
„ „ „ of other base metals	„	74 *d.*	4 0	0 8 0
„ machines	„	74 *b.*	1 33	0 2 7½
„ ships, per ton	XVIII.	71 *b.*	5 25	0 10 6
„ waggons (locomotives)	XIX.	74 *a.*	1 0	0 2 0
Stearine (consisting of manganic and elaiodic acid; after the removal of the acid, glycerine is the result)	VI.	22 *b.*	1 50	0 3 0
„ candles	XX.	77 *b.*	5 25	0 10 6
„ acid	VI.	22 *b.*	1 50	0 3 0
Steel (tube converted, cast, and refined, not figured)	X.	40 *d.* 1.	1 25	0 2 6
„ raw (crude), in blocks or castings	„	40 *d.* 2.	0 75	0 1 6
„ in rods, figured	„	40 *f.* 3.	1 75	0 3 6
„ „ „ for files. *See* Files, steel.				
„ raw, not polished	„	40 *e.* 1.	2 0	0 4 0
„ plates (sheet steel), ground, polished	„	40 *f.* 1.	4 0	0 8 0
„ „ punched	XVII.	69 *a.* 1.	4 0	0 8 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Steel wire, polished	X.	40 *h.* 1.	4 0	0 8 0
„ „ not polished	„	40 *f.* 2.	2 0	0 4 0
„ pens, for writing	XVII.	69 *c.* 1.	15 0	1 10 0
„ „ other kinds	„	69 *c.* 2.	6 0	0 12 0
„ beads	„	„	6 0	0 12 0
„ plates, raw (not polished)	X.	40 *e.* 1.	2 0	0 4 0
„ „ ground, polished	„	40 *f.* 1.	4 0	0 8 0
„ strings (wires)	„	40 *h.* 1.	4 0	0 8 0
„ bars (rods), round, under ½ Vienna inch in diameter, same as steel wire.				
„ bars (rods), round, ½ Vienna inch thick, and over, no matter whether ground, polished, or not	„	40 *d.* 1.	1 25	0 2 6
„ engravings, on paper	XXI.	79 *b.*	Free.	
„ wares. *See* Iron wares.				
„ stamps (dies)	XVII.	69	4 0	0 8 0
Steeple clocks	„	69 *b.* 1.	4 0	0 8 0
Stirrups	-	-	According to nature of material.	
Stocking frames, iron	XIX.	74	1 0	0 2 0
„ **goods,** cotton	XIII.	52 *b.* 3.	30 0	3 0 0
„ „ linen	„	53 *e.*	40 0	4 0 0
„ „ woollen	„	54 *c.* 2.	35 0	3 10 0
„ „ entirely of silk	„	55 *a.*	80 0	8 0 0
„ „ in which the loom-thread consists for the most part of silk or flock silk	„	55 *b.*	60 0	6 0 0
Stockings cotton	„	52 *b.* 3.	30 0	3 0 0
„ linen	„	53 *e.*	40 0	4 0 0
„ woollen	„	54 *c.* 2.	35 0	3 10 0
„ silk	„	55 *a.*	80 0	8 0 0
„ leathern	XV.	62	5 50	0 11 0
Stone prints, on paper, painted like oil pictures, varnished, and pasted on linen stretched on a wooden frame	XXI.	79 *c.*	Free.	
„ **coals** (pit coals, also coke)	VIII.	30 *b.*	Free.	
„ „ ash	XXII.	80 *b.*	Free.	
„ „ naphtha. Like tar oil.				
„ „ tablets of, for electric batteries	XX.	76 *d.* 1.	5 0	0 10 0
„ „ tar made from	IX.	35 *a.*	Free.	
„ „ tar oil made from. *See* Tar Oil.				
„ **jugs,** of earthenware, not combined with other materials	XVI.	67 *a.*	0 25	0 0 6
„ „ of earthenware, with lid and fittings of tin	„	67 *b.* 1.	2 50	0 5 0
„ **ware** (earthenware, crockery), of one colour and white	„	„	2 50	0 5 0
„ „ gilt, plated	„	67 *c.* 1.	4 50	0 9 0
„ „ of several colours, painted, printed	„	67 *c.* 2.	2 50	0 5 0
„ „ combined with materials not coming under the category of petty or hard wares	„	67 *d.* 2.	6 0	0 12 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Stone ware vessels, for manufacturing purposes in chemical laboratories, not holding more than 40 Vienna mass	XVI.	67 *a.*	0 25	0 0 6
„ „ *See* Stone work.				
„ rotten	VIII.	32 *a.* 1.	Free.	
Stonemasons' work, common, not ground	„	32 *a.* 3.	Free.	
Stonework, *i.e.*, real stones (*i.e.*, precious and semi-precious stones), coral (real and imitation), worked (*i.e.*, ground, cut, or worked in another way), real pearls; all these articles not mounted	„	66 *a.*	12 0	1 4 0
„ statues in pieces, heavier than 10 lbs.; however only combined with unstained, uncoloured, unpolished, or unlacquered wood, or with either gilt or silvered rods and plates of base metals	„	66 *b.* 1.	Free.	
„ other kinds of, in pieces, heavier than 10 lbs., in the foregoing combinations	„	66 *b.* 2.	0 75	0 1 6
„ all other kinds, also in combinations not coming under the category of petty or hard wares	XVI.	66 *c.*	6 0	0 12 0
„ of arragonite and other limestones, in combination with base metals, not gilt or plated	„	„	6 0	0 12 0
„ if it represents ladies' or gentlemen's ornaments, or other knick-knacks and toilet articles, in combination with base metals, not gilt or plated, fine worked (unburnished)	XVII.	70 *c.* 2.	6 0	0 12 0
Stones, rough, not ground or polished	VIII.	32 *a.* 1.	Free.	
„ ground, polished	„	32 *c.* 1.	0 80	0 1 7½
„ real, mounted	XIX.	75 *a.*	75 0	7 10 0
„ „ not mounted	XVI.	66 *a.*	12 0	1 4 0
Straw (and ears of), in a natural state, for milinery	III.	13 *c.*	Free.	
„ bands, not combined with other materials	XIV.	59 *d.* 2.	1 0	0 2 0
„ flowers made of, combined with woven goods, with Manilla hemp threads representing the stamens, or of split straw pasted on a cotton stuff	XIII.	57 *c.* 1.	85 0	8 10 0
„ plaitings, like ribbons, of all descriptions, not combined with other materials	XIV.	59 *d.* 2.	1 0	0 2 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Straw wares, not combined with other materials - - -	XIV.	59 *d.* 1.	6 0	0 12 0
„ „ combined with other materials, or interwoven or worked in with silk or other textures, or with horse hair - - -	„	59 *e.*	25 0	2 10 0
„ hats, trimmed, per piece - -	XIII.	57 *c.* 3.	0 20	0 0 5
„ „ untrimmed - - -	XIV.	59 *f.* 1.	262 50	26 5 0
„ knives, for cutting - - -	XVII.	69 *b.* 3.	2 0	0 4 0
„ paper, rough on one or on both sides	XIV.	60 *a.* 2.	Free.	
„ goods, floor cloths and mats, coloured	„	59 *c.* 1.	2 50	0 5 0
„ „ brushes and brooms of rice-straw, also combined with wood without lacquer and polish - - -	„	59 *a.*	0 25	0 0 6
„ „ floor-cloths and mats, uncoloured - - -	„	59 *a.*	0 25	0 0 6
„ „ for domestic use, also combined with unstained, uncoloured, unpolished, or unlacquered wood - -	„	59 *c.* 1.	2 50	0 5 0
„ „ plaitings, like ribbons	„	59 *d.* 2.	1 0	0 2 0
„ „ „ others - -	„	59 *d.* 1.	6 0	0 12 0
„ „ „ interwoven or worked in with silk or other textures, or with horse-hair (and esparto grass) - -	„	59 *e.*	25 0	2 10 0
„ „ „ combined with glass beads - -	„	59 *d.* 1.	6 0	0 12 0
„ „ „ combined with imitation leonine textures, wound on cotton yarn -	„	59 *e.*	25 0	2 10 0
Strings, spun over with silk - -	XIX.	75 *c.* 2.	25 0	2 10 0
„ others, of gut - - -	„	75 *d.*	25 0	2 10 0
„ steel - - - -	X.	40 *h.*	4 0	0 8 0
„ brass - - - -	„	43 *c.* 1.	4 0	0 8 0
Sucking-pigs - - - -	IV.	15 *g.*	0 18	0 0 4½
Suet (of deer) - - - -	VI.	22 *d.* 1.	0 80	0 1 7½
Sugar, refined - - - -	I.	7 *a.*	13 15	1 6 4
„ liquid - - - -	„	7 *b.*	9 45	0 18 10½
„ forms (moulds), of common potter's clay - -	XVI.	67 *a.*	0 25	0 0 6
„ „ „ iron - -	XVII.	69 *a.* 1.	4 0	0 8 0
„ candy - - - -	I.	7 *a.*	13 15	1 6 4
„ powdered (raw sugar) -	„	7 *b. c.*	9 45	0 18 11
„ syrup (molasses, treacle) -	„	7 *d.*	3 15	0 6 4
Sulphur, in pieces and sticks, also ground -	IX.	37 *a.*	Free.	
„ flowers of - - - -	„	„	Free.	
„ liver of (sulphuret of potash) -	XX.	76 *d.* 1.	5 0	0 10 0
Sulphurated match (quick match) -	„	78 *a.*	Free.	

DESCRIPTION OF ARTICLES.	Austrian Tariff. Class.	Section.	Duty per Cwt. of 110·25 lbs. avoirdupois. Austrian Currency.	English Value.
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Sulphuret of iron (a black greyish substance indissoluble in water)	XX.	76 *d.* 1.	5 0	0 10 0
Sulphuric acid (oil of vitriol)	IX.	37 *c.* 2.	0 25	0 0 6
„ ether	XX.	76 *d.* 1.	5 0	0 10 0
Sumach	IX.	34 *b.*	Free.	
Sundials, wooden	XVI.	64	Free.	
Sunflower seeds	III.	13 *f.* 2.	Free.	
Sunshades, Japanese (Chinese), made of an ordinary bamboo cane and paper	XVI.	64 *d.* 2.	6 0	0 12 0
„ of woven goods	XIX.	75 *b.*	75 0	7 10 0
Superphosphate, obtained from bone-dust or refuse treated with sulphuric acid	XXII.	80 *d.*	Free.	
„ from guano	„	80 *b.*	Free.	
„ „ ammonia or kali	„	80 *a.*	Free.	
Swan-necks (surgical)	XIX.	73 *b.*	Free.	
Sweetmeats	VII.	28 *e.* 1.	10 0	1 0 0
Swimming belts or rings, of coarse linen with cork parings, stitched, sewn	XIII.	57 *a.*	25 0	2 10 0
Swords and blades of (weapons)	XVII.	69 *c.* 2.	6 0	0 12 0
„ sheaths for. *See* Sabres	-	-	According to nature of material.	
Syringes (surgical and clysters)	XIX.	73 *b.*	Free.	
Syrup (of sugar, molasses, treacle)	I.	7 *d.*	3 15	0 6 4
T.				
Table linen. *See* Linen.				
Tables, wooden (rough)	XVI.	64 *a.*	Free.	
„ „ painted, lacquered, polished	„	64 *c.* 1.	1 50	0 3 0
Tablets (slate), also with unpolished or lacquered wooden frames	VIII.	32 *c.* 2. *a.*	0 75	0 1 6
„ „ in polished or lacquered wooden frames	XVI.	64 *c.* 1.	0 80	0 1 7½
„ made of slate-paper, not combined with other materials	VIII.	32 *c.* 2.	0 75	0 1 6
„ wooden, covered over with a black varnish substance, in wooden frames	XVI.	64 *c.* 1.	1 50	0 3 0
„ of brass or copper, plated	XVII.	70 *c.* 2.	6 0	0 12 0
Tacks, of iron	„	69 *c.* 2.	6 0	0 12 0
Taffeta (sarsnet), silk	XIII.	55 *a.*	80 0	8 0 0
Tailors' shears (snips), inferior	„	69 *b.* 1.	4 0	0 8 0
„ implements, iron	„	69 *b.*	4 0	0 8 0
Tallow (melted fat of oxen or sheep)	VI.	22 *d.* 2.	Free.	
„ candles	XX.	77 *c.*	3 15	0 6 4
Tamarinds	III.	13 *h.* 1.	0 80	0 1 7½
„ with sugar or honey	VII.	28 *e.* 1.	10 0	1 0 0
Tamarisk bark	III.	13 *h.* 1.	0 80	0 1 7½
Tambour needles (for embroidery frames)	XVII.	69 *c.* 2.	6 0	0 12 0
„ goods. *See* Embroidery goods.				

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Tapioca	I.	4. 2.	0 75	0 1 6
Tarlatans, cotton	XIII.	52 *c.* 2.	45 0	4 10 0
„ half silk	„	55 *b.* 2.	60 0	6 0 0
Tar oil	IX.	35 *c.* 2.	0 75	0 1 6
„ felt (asphalted felt)	XIV.	60 *a.* 1.	Free.	
Tattings. *See* Bobbin Nets.				
Taws (marbles) of marble	XVI.	66 *b.* 1.	Free.	
„ of glass	„	65 *a.*	0 75	0 1 6
Tea	I.	6	15 75	1 11 6
„ machines (urns)	- -	- -	According to nature of material.	
Teeth, animal	VIII.	31 *a.* 2.	Free.	
„ artificial (false)	XIX.	75 *b.* 2.	50 0	5 0 0
Telescopes (field glasses)	„	73 *b.*	Free.	
Tenders and springs for (railway)	„	74 *c.*	2 0	0 4 0
Tents of woven stuffs, combined with wood or iron — according to the combination	XVI.	64 *d.* 2.	6 0	0 12 0
	XVII.	69 *c.* 2.	6 0	0 12 0
Terra-cotta wares. *See* Stoneware.				
Thermometers	XIX.	73 *b.*	Free.	
Thibet, printed	XIII.	54 *d.*	35 0	3 10 0
„ not printed	„	54 *c.* 1.	35 0	3 10 0
„ cloths (wraps) with shawl borderings. *See* Shawls.				
Thimbles, iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ others	- -	- -	According to nature of material.	
Tin, raw	X.	43 *a.*	Free.	
„ drawn, stretched, and rough castings	„	43 *b.*	2 0	0 4 0
„ putty (oxyde of tin)	„	43 *a.*	Free.	
„ chloride of, containing sal-ammoniac and muriate (pink salt)	XX.	76 *d.* 1.	5 0	0 10 0
„ ores	X.	38 *a.* 1.	Free.	
„ foil	XVII.	70 *c.* 2.	6 0	0 12 0
„ castings, raw, not further prepared	X.	43 *b.*	2 0	0 4 0
„ wares, common, *i.e.*, rollers (cylinders)	XVII.	70 *a.* 1.	4 0	0 8 0
„ *plates*	X.	40 *f.* 1.	4 0	0 8 0
Tin-wares, kettles, plates, dishes, pots, and other kinds of cooking utensils, not combined with other materials	„	70 *a.* 2.	2 50	0 5 0
„ other kinds of	„	70 *c.* 2.	6 0	0 12 0
Tiles (roofing and wall) of clay	VIII.	32 *a.* 1.	Free.	
„ (hollow, and plaster tiles) of common potters' clay, painted, glazed	XVI.	67 *a.*	0 25	0 0 6
„ clay, for (common)	VIII.	32 *a.* 3.	Free.	
Tinctures	XX.	76 *a.*	15 0	1 10 0
Tinder, natural (of burnt linen)	XX.	78 *a.*	Free.	
„ artificial (chemically prepared)				
„ (rotten wood)	III.	13 *h.* 1.	0 80	0 1 7½
„ paper	XX.	78 *a.*	Free.	
N.B.—If packed in coloured paper boxes, chargeable like paper goods.				

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			fl. kr.	£ s. d.
Tobacco, raw „ leaves, raw „ blossoms „ ribs „ stems *See* Preface to Customs' Tariff.	II.	8 *a.*	10 50	1 1 0
„ pouches, of animal bladders, manufactured	XV.	62 *c.*	6 0	0 12 0
„ pouches, of woven or textile stuffs, cut out, sewn	XIII.	57	25 0	2 10 0
„ „ other kinds	- -	- -	According to nature of material.	
„ manufactures, *i.e.*, smoking tobacco in rolls, unrolled, or leaves deprived of their ribs, or cut; rolls or stems for snuff, tobacco powder, wastes, cigars, and snuff *See* Preface to Customs' Tariff.	II.	8 *b.*	26 25	2 12 6
„ paper	„	„	26 25	2 12 6
„ pipes, earthen, white, of one colour	XVI.	67 *b.* 2.	2 50	0 5 0
„ „ painted	„	67 *c.* 2.	2 50	0 5 0
„ „ other kinds	- -	- -	According to nature of material.	
„ „ fittings for	- -	- -	According to nature of material.	
„ „ wood, for the stems of, rough, prepared	„	64 *a.*	Free.	
„ „ bowls „ „ tubes	- -	- -	According to nature of material.	
Toilet articles, gold or silver	XIX.	75 *a.*	75 0	7 10 0
„ „ of base metals, real gilt, plated, or mounted with gold or silver	„	75 *b.* 3.	25 0	2 10 0
„ „ imitation gilt or plated (burnished)	„	75 *c.* 2.	50 0	5 0 0
„ „ of base metals, fine-worked, not burnished, combined with alabaster, ivory, enamel, paste, &c.	XVII.	70 *c.* 1.	15 0	1 10 0
„ „ other kinds	- -	- -	According to nature of material.	
Tombac (red brass), raw	X.	43 *a.*	Free.	
„ „ drawn, stretched	„	43 *c.* 2.	3 0	0 6 0
„ goods	XVII.	70 *a.* 1.	4 0	0 8 0
Tongs, scoured, black or white only, or not completed, finished off	„	69 *a.* 1.	4 0	0 8 0
„ as locksmiths' implements (pincers)	„	69 *a.* 3.	2 0	0 4 0
„ ground (finished off), varnished	„	69 *c.* 3.	4 0	0 8 0
„ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ surgical (tweezers)	XIX.	73 *a.*	3 0	0 6 0
Tonquin beans	IX.	33 *a.* 1.	5 25	0 10 6

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Tools, as instruments	XIX.	73 *b.*	Free.	
„ others	- -	- -	According to nature of material.	
Tooth brushes, with handles of wood or iron, either coloured, lacquered, stained, varnished, or polished	XIV.	58 *a.*	1 0	0 2 0
„ brushes with handles in other combinations not coming under the category of petty or hard wares	„	58 *b.* 1.	6 0	0 12 0
„ brushes, with handles of tortoiseshell or amber	XIX.	75 *c.* 1.	50 0	5 0 0
„ brushes with handles of precious metals	„	75 *b.* 1.	75 0	7 10 0
„ brushes, with handles of base metals, gilt, plated	„	75 *b.* 3.	25 0	2 10 0
„ fillings (gutta-percha)	XX.	76 *d.* 1.	5 0	0 10 0
„ powder	„	76 *a.*	15 0	1 10 0
„ picks, wooden	XVI.	64 *a.*	Free.	
„ „ bone	„	63 *b.* 2.	6 0	0 12 0
„ „ others	- -	- -	According to nature of material.	
„ tinctures	XX.	76 *a.*	15 0	1 10 0
Tortoises	IV.	14 *d.*	1 50	0 3 0
Tortoiseshell	VIII.	31 *a.* 1.	Free.	
„ goods made of	XIX.	75 *c.* 1.	50 0	5 0 0
Touchstones	VIII.	32 *c.* 2. *b.*	Free.	
Tow (oakum)	XI.	46	Free.	
Toys, greenish, golden	XVI.	67	0 25	0 0 6
See Preface to Customs' Tariff.				
Train oil	VI.	22 *c.*	0 53	0 1 0½
Transport, means of. *See* Preface to Customs' Tariff.				
Travelling Bags, of woven or textile stuffs	XV.	62 *d.* 3.	10 50	1 1 0
„ bags, other kinds. *See* Trunk-makers' goods.				
Travelling clocks	XIX.	75 *c.* 2.	25 0	2 10 0
Triangles, musical instrument	„	73 *a.*	3 0	0 6 0
Trinkets. *See* Jewellery.				
Tripods, iron	XVII.	69 *a.* 3.	2 0	0 4 0
Trombones	XIX.	73 *a.*	3 0	0 6 0
Troughs, wooden	XVI.	64 *a.*	Free.	
„ stone, unpolished	VIII.	32 *a.* 1.	Free.	
„ „ polished	XVI.	66 *b.* 2.	0 75	0 1 6
Trousers (leathern)	XV.	62 *a.* 1.	5 50	0 11 0
„ others	- -	- -	According to nature of material.	
„ braces for (leathern)	„	„	5 50	0 11 0
„ „ sewn, or with any extraneous appendage	XIII.	57 *a.* 1.	25 0	2 10 0
„ „ others	- -	- -	According to nature of material.	
Truffles, fresh	III.	9 *a.*	Free.	
„ pickled	VII.	28 *e.* 1.	10 0	1 0 0
Trumpets and drums	XIX.	73 *a.*	3 0	0 6 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Trunkmakers' goods, of tanned, red tanned, or only blackened leather, of hairy skins, of unlacquered, uncoloured, unprinted india-rubber or gutta-percha	XV.	62 *c.*	6 0	0 12 0
„ „ of chamois, tawed, coloured, or lacquered leather, of leather-cloth, fine oil-cloth (waxed muslin, wax taffety) - -	„	62 *d.* 3.	10 50	1 1 0
„ „ of coarse, unprinted oil-cloth, grey canvas, sail-cloth, rough drill, or huckaback -	„	62 *d.* 4.	6 0	0 12 0
Trunks, empty, of wood, not coloured -	XVI.	64 *a.*	Free.	
„ „ „ coloured, stained, varnished, lacquered, polished	„	64 *c.*	1 50	0 3 0
„ „ „ bound with iron, and covered with oil-cloth -	„	64 *d.* 2.	6 0	0 12 0
„ others. *See* Trunkmakers' goods.				
Tulle, English - - - - -	XIII.	52 *d.*	60 0	6 0 0
„ „ shape cotton - - -	„	„	60 0	6 0 0
„ „ „ woollen - - -	„	54 *e.* 1.	50 0	5 0 0
Tunny fish, in oil - - - -	VII.	28 *e.* 4.	5 25	0 10 6
Turf (peat) - - - - -	VIII.	30 *a.*	Free.	
Turkeys - - - - -	IV.	16 *c.*	Free.	
Turkish pepper - - - -	I.	3 *a.*	8 0	0 16 0
„ „ in vinegar, in cases and glasses - - -	VII.	28 *e.* 1.	10 0	1 0 0
„ wheat - - - - -	III.	10 *b.*	0 27	0 0 6½
Turners' goods, of wood, coarse, rough, uncoloured - -	XVI.	64 *a.*	Free.	
„ „ of wood, coloured, stained, varnished, lacquered, polished - -	„	64 *c.* 1.	1 50	0 3 0
„ „ of wood, superior, also combined with other materials, not coming under the category of petty or hard wares - -	„	64 *d.* 2.	6 0	0 12 0
„ „ of bone - - -	„	63 *b.* 1.	15 0	1 10 0
„ **stuff** (materials) - - -	VIII.	31	Free.	
Turn-tables, for railways - - -	XIX.	74 *b.*	1 33	0 2 7½
Turning lathes, wooden - - -	XVI.	64 *a.*	Free.	
„ „ iron - - -	XIX.	74	1 0	0 2 0
Turnips, fresh - - - -	III.	9 *a.*	Free.	
„ burnt, pulverised - - -	I.	2 *a.* 2.	1 0	0 2 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Turnips, dried, parched, pickled in vinegar in casks	III.	9 *b.* 1.	0 75	0 1 6
„ otherwise prepared	VII.	28 *e.* 1.	10 0	1 0 0
Turpentine	IX.	35 *b.* 2.	0 42	0 0 10½
„ spirit of	„	35 *c.* 2.	0 75	0 1 6
„ oil (also pitch and tar oil)	„	„	0 75	0 1 6
Twine, of two threads of different stuffs, viz., of cotton and linen yarn, same as untwisted cotton yarn.				
Type (printers')	X.	39 *b.* 1.	2 50	0 5 0
Tyres	„	40 *e.* 2.	2 0	0 4 0
Tyrolese earth. *See* Coloured Clay.				
U.				
Ulm bread	VII.	28 *a.*	0 80	0 1 7½
„ barley	III.	12	0 80	0 1 7½
Ultramarine (sky blue)	XX.	76 *d.* 1.	5 0	0 10 0
Umbra (Cologne earth)	VIII.	32 *b.*	Free.	
Umbrellas:				
Common { frames / stands } for, according to the nature of the material	XIII.	75 *b.* 1.	75 0	7 10 0
Wool-fine	„	*a.* 2.	45 0	4 10 0
Half silk	„	*b.*	60 0	6 0 0
Under-clothing (leathern)	XV.	62 *c.*	6 0	0 12 0
Uranium, oxide or acid, an orange-yellow colour, indissoluble in water, for porcelain painting, calico printing, and glass colouring	XX.	76 *d.* 1.	5 0	0 10 0
V.				
Valerian	III.	13 *h.* 1.	0 80	0 1 7½
Vallonea (acorn husks)	IX.	34 *c.*	Free.	
Vanilla	I.	3 *b.*	15 75	1 11 6
Varnish, mixed with spirits of wine	VII.	26 *a.* 2.	9 0	0 18 0
„ rosin (solutions of rosins and similar substances in any solution)	XX.	76 *c.* 1.	15 0	1 10 0
„ oil, in flasks and jars	VI.	23 *a.*	5 0	0 10 0
„ „ in casks and skins	„	23 *b.* 1.	1 50	0 3 0
Vases, according to the nature of the material.				
Vegetable spinning stuffs	XI.	46	Free.	
„ wax	V.	20 *b.*	2 50	0 5 0
Vegetables, fresh	III.	9 *a.*	Free.	
„ dried, parched, compressed, cut up, or otherwise divided, pickled in vinegar in casks	„	9 *b.* 1.	0 75	0 1 6
„ in sugar, honey, oil, or otherwise	VII.	28 *e.* 1.	10 0	1 0 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Veils, cotton	XIII.	52 *c.* 2.	45 0	4 10 0
„ linen	„	53 *f.*	60 0	6 0 0
„ silk	„	55 *b.*	60 0	6 0 0
„ *cut out,* worked	„	57 *a.* 1.	25 0	2 10 0
Velocipedes, combined with leather and upholstery work; same as saddlery.				
„ others	XVII.	69 *c.* 2.	6 0	0 12 0
Velours (like flannel)	XIII.	54 *c.* 1.	35 0	3 10 0
Velvet, cotton	„	52 *b.* 3.	30 0	3 0 0
„ woollen	„	54 *c.* 1.	35 0	3 10 0
„ silk, entirely of	„	55 *a.* 1.	80 0	8 0 0
„ „ half	„	55 *b.* 2.	60 0	6 0 0
„ stuffs woven like, *i.e.,* those in which the pile is produced by separate threads of the texture (two threads and three Trentschümel). *See* Velvet.				
Velveteen, cotton	„	52 *b.* 3.	30 0	3 0 0
„ woollen	„	54 *c.* 1.	35 0	3 10 0
„ silk	„	55 *b.* 2.	60 0	6 0 0
Venetian chalk	VIII.	32 *a.*	Free.	
Ventilators	XIX.	74 *b.*	1 33	0 2 7½
Verdigris	IX.	37 *e.* 1.	1 50	0 3 0
Vermicelli, of flour	VII.	28 *b.* 2.	2 50	0 5 0
Veronese yellow (Cassel yellow)	XX.	76 *d.* 1.	5 0	0 10 0
Vetches (tares)	III.	10 *b.*	0 27	0 0 6½
Vinegar, in bottles and jars	VII.	25 *a.*	5 0	0 10 0
„ in casks	„	25 *b.*	0 80	0 1 7½
„ perfumed	IX.	33 *b.* 2.	5 0	0 10 0
„ spirit (pyro-acetic spirit)	XX.	76 *d.* 1.	5 0	0 10 0
„ (medicinal)	„	76 *a.*	15 0	1 10 0
Violet roots	III.	13 *h.* 1.	0 80	0 1 7½
„ „ powdered, in paper	XX.	76 *c.* 2.	12 0	1 4 0
Violins and bows (fiddlesticks)	XIX.	73 *a.*	3 0	0 6 0
Violoncellos and bass viols	„	„	3 0	0 6 0
Vitriol, of iron (green vitriol)	IX.	37 *b.*	Free.	
„ mixed (iron and copper)	„	37 *d.* 1.	0 75	0 1 6
„ copper and zinc	„	„	0 75	0 1 6
„ oil of (sulphuric acid)	„	37 *c.* 2.	0 25	0 0 6
Vomic nuts	III.	13 *h.* 1.	0 80	0 1 7½
W.				
Wadding, cotton	XII.	49 *a.* 1.	5 25	0 10 6
Wads, of cow-hair, covered over on both sides with paper (also combined with glued cartridge cases [empty])	XIV.	60 *g.* 2.	6 0	0 12 0
Wafers, of flour	VII.	28 *b.* 1.	2 50	0 5 0
„ of isinglass	XX.	76 *d.* 1.	5 0	0 10 0
„ of paper	XIV.	60 *g.* 2.	6 0	0 12 0
Walker's, Dr., oriental water	XX.	76 *a.*	15 0	1 10 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Wall clocks (time-pieces) for hanging on, excepting those made of wood	XIX.	75 *c.* 2.	25 0	2 10 0
„ „ „ Swiss	XVI.	64 *d.* 2.	6 0	0 12 0
Washing blue	XX.	76 *d.* 1.	5 0	0 10 0
„ **baskets**, coarse, coloured	XVI.	64 *c.* 1.	1 50	0 3 0
„ „ „ uncoloured	„	64 *a.*	Free.	
„ **powder** (made of common coarse powdered soap and soda)	XX.	77 *e.* 1.	3 0	0 6 0
Wastes, of bath or horse sponges	V.	21 *b.* 1.	0 80	0 1 7½
„ of ivory	VIII.	31 *a.* 2.	Free.	
„ of meerschaum	„	31 *a.* 1.	Free.	
„ of cotton yarn	XI.	45 *a.*	Free.	
„ of woollen „	„	47 *a.*	Free.	
„ of silk stuffs	„	48 *c.*	Free.	
„ for paper manufacture	XXII.	80 *c.*	Free.	
„ other kinds, named in the Tariff	„	80	Free.	
„ those not specially named in the Tariff. *See* Raw Stuffs.				
Watch cases, of gold and silver, not combined with other materials	XIX.	75 *a.*	75 0	7 10 0
„ „ of gold and silver, with glasses or other materials, or of platinum	„	75 *b.* 1.	75 0	7 10 0
„ „ of real gilt or plated base metals	„	75 *b.* 3.	25 0	2 10 0
„ „ of copper, brass, tombac, and other base metals	XVII.	70 *c.* 2.	6 0	0 12 0
„ „ others	-	-	According to nature of material.	
„ „ (clock cases) wooden	XVI.	64 *d.* 2.	6 0	0 12 0
„ „ others	-	-	According to nature of material.	
„ **chains**, of iron	XVII.	69 *c.* 2.	6 0	0 12 0
„ „ of brass, copper, and other base metals	„	70 *c.* 2.	15 0	1 10 0
„ „ do. do. not burnished, combined with alabaster, ivory, enamel, paste, &c.	„	70 *c.* 1.	50 0	5 0 0
„ „ of brass, copper, and other base metals, imitation gilt, plated (burnished)	XIX.	75 *c.* 2.	25 0	2 10 0
„ „ of brass, copper, and other base metals, real gilt, plated	„	75 *b.* 3.	25 0	2 10 0
„ „ of gold or silver	„	75 *a.*	75 0	7 10 0
„ **glasses**, ground	XVI.	65 *c.* 1.	4 0	0 8 0
„ materials, and parts of watches, gilt, plated	XIX.	75 *b.* 3.	25 0	2 10 0
„ „ and parts of watches, of iron	XVII.	69 *c.* 1.	15 0	1 10 0
„ „ of other base metals	„	70 *c.* 1.	15 0	1 10 0
„ **works** (movements) of iron	„	69 *c.* 1.	15 0	1 10 0

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	Class.	Section.	Austrian Currency.	English Value.
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Watch works of other base metals -	XVII.	70 *c.* 1.	15 0	1 10 0
„ „ of gilt or plated base metals	XIX.	75 *b.* 3.	25 0	2 10 0
Watchmakers' tools - - -	- -	- -	According to nature of material.	
Watches, gold, silver - - -	XIX.	75 *a.* 3.	75 0	7 10 0
„ all other kinds - - -	„	75 *b.* 1.	75 0	7 10 0
Water - - - - -	VIII.	32 *a.* 3.	Free.	
„ vessels to work in, wooden - -	XVIII.	71 *a.*	0 42	0 0 10½
„ (boats), iron, of zinc or other base metals - - - -	„	71 *b.*	5 25	0 10 6
„ fennel - - - -	III.	13 *h.* 1.	0 80	0 1 7½
„ glass (silicic acid, kali, or soda) -	IX.	37 *d.* 1.	0 75	0 1 6
„ nuts, water thistles - - -	III.	13 *h.* 1.	0 80	0 1 7½
„ pumps, iron. *See* Pumps.				
„ animals - - - -	IV.	14	Free.	
„ levels (spirit levels, hydrometers) -	XIX.	73 *b.*	Free.	
Wax, white and yellow - - -	V.	20 *b.*	2 50	0 5 0
„ coloured - - - - -	XX.	76 *d.* 1.	5 0	0 10 0
„ embossed (mixed with turpentine) -	„	„	5 0	0 10 0
„ embossed, goods made of - -	XIX.	75 *c.* 2.	25 0	2 10 0
„ plants (Japanese, Chinese, palm ware, milk-tree ware) - - - -	V.	20 *b.*	2 50	0 5 0
„ manufactures, *i.e.*, wax candles (wax lights), wax torches, wax tapers - -	XX.	77 *a.*	8 0	0 16 0
„ „ other kinds embossed -	XIX.	75 *c.* 2.	25 0	2 10 0
„ torches - - - - -	XX.	77 *a.*	8 0	0 16 0
„ candles - - - - -	„	„	8 0	0 16 0
„ yellow - - - - -	„	76 *d.* 1.	5 0	0 10 0
„ cloth (oil-cloth) - - -	XIII.	56 *b.* 2.	5 0	0 10 0
„ muslin - - - -	„	56 *b.* 1.	10 0	1 0 0
„ canvas (packing canvas covered over with wax) printed - -	„	56 *b.* 2.	5 0	0 10 0
„ „ not printed - - -	„	56 *a.*	1 0	0 2 0
„ pearls - - - - -	XIX.	75 *b.* 2.	50 0	5 0 0
„ tapers - - - - -	XX.	77 *a.*	8 0	0 16 0
Waxed paper - - - -	XIV.	60 *c.*	1 50	0 3 0
Weapons, and parts of, iron, of all kinds (with the exception of fire-arms) - - - -	XVII.	69 *c.* 2.	6 0	0 12 0
„ arms (fire-arms) of all kinds -	„	69 *c.* 2.	6 0	0 12 0
„ combined with materials not coming under the category of petty or hard wares - -	XIX.	75 *b.* 1.	75 0	7 10 0
Weavers' reeds (sleys, pointed canes) -	XVI.	64 *c.* 1.	1 50	0 3 0
„ materials, of rough pieces of wood, and glued linen, twine, without metallic rings - -	XII.	50 *c.* 1.	6 0	0 12 0
„ „ other kinds - -	- -	- -	According to parts most covered.	
„ sleys, of steel, ground - -	XVII.	69 *c.* 3.	4 0	0 8 0
„ „ polished - -	„	69 *c.* 2.	6 0	0 12 0
„ looms, wooden - - -	XVI.	64 *a.*	Free.	

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Weavers' looms, iron, mechanical (power-looms)	XIX.	74 *c.*	2 0	0 4 0
Wedgwood	XVI.	67	0 25	0 0 6
Weighbridges	XVII.	69 *c.* 3.	4 0	0 8 0
Weights of cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ of wrought iron, common	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ „ ground, varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ of copper, brass	„	70 *c.* 2.	6 0	0 12 0
„ other kinds	-	-	According to nature of material.	
Whale fins (fish bone, raw)	VIII.	31 *a.* 1.	Free.	
Wheat	III.	10 *a.*	0 35	0 0 8½
Wheel boxes (sockets) iron, not ground off	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ „ iron, completely ground off	„	69 *c.* 3.	4 0	0 8 0
„ „ „ iron, lacquered, polished	„	69 *c.* 2.	6 0	0 12 0
„ „ „ of other metals	„	70 *c.* 2.	6 0	0 12 0
„ „ „ real gilt, plated	XIX.	75 *b.* 3.	25 0	2 10 0
„ felloes, roughly prepared	VIII.	29 *b.*	Free.	
„ „ finished	XVI.	64	Free.	
„ tyres	X.	40 *e.* 2.	1 75	0 3 6
„ streaks (finished tyres) of iron	XVII.	69 *a.* 1.	4 0	0 8 0
„ skids (skid-shoes), wooden, rough	XVI.	64 *a.*	Free.	
„ „ „ iron, rough	XVII.	69 *a.* 3.	2 0	0 4 0
Wheelwrights' work, rough, uncoloured	XVI.	64 *a.*	Free.	
„ „ „ painted, varnished, lacquered	„	64 *c.* 1.	1 50	0 3 0
Wheels, wooden, rough	„	64 *a.*	Free.	
„ „ coloured, stained, lacquered, or polished	„	64 *c.* 1.	1 50	0 3 0
„ iron, rough-hammered, the price over 50 pounds	X.	40 *g.* 2.	1 25	0 2 6
„ wrought iron, others	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ „ ground, varnished	„	69 *c.* 3.	4 0	0 8 0
„ „ „ polished, lacquered, also combined with other materials not coming under the category of petty or hard wares	„	69 *c.* 2.	6 0	0 12 0
„ cast iron, rough	X.	40 *i.* 1.	0 60	0 1 2½
„ „ „ turned, filed, mortised	XVII.	69 *a.* 3.	2 0	0 4 0
„ iron, for locomotives or tenders	XIX.	74 *b.*	1 33	0 2 7½
„ cast, of other base metals, in rough pieces	X.	43 *c.* 2.	3 0	0 6 0
„ cast, further worked	XVII.	70 *c.* 2.	6 0	0 12 0
Whetstones, common	VIII.	32 *a.*	Free.	
„ superior	„	32 *c.* 2.	Free.	
„ artificial, without fittings	„	„	Free.	
Whips, leathern	XV.	62	5 50	0 11 0

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	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Whips, other	- -	- -	According to nature of material.	
„ sticks, wooden, rough	XVI.	64 *a.*	Free.	
„ „ wooden, woven over with textile or woven goods, or plaited over	XIX.	75 *b.* 3.	25 0	2 10 0
„ „ wooden, plaited over with gut strings	XV.	62 *d.* 4.	6 0	0 12 0
„ „ other kinds	- -	- -	According to nature of material.	
Wicks, not woven (with or without a covering of wax)	XII.	49 *b.* 2.	6 0	0 12 0
„ woven	XIII.	52 *a.* 2.	12 0	1 4 0
„ silk, or mixed with silk	„	55 *b.* 3.	60 0	6 0 0
Wigs, made of silk or other woven or textile materials	„	57 *c.* 1.	85 0	8 10 0
„ made of human hair	XIX.	75 *b.* 1.	75 0	7 10 0
Wild boars	IV.	16 *a.*	1 58	0 3 2
Willow bark	IX.	34 *b.*	Free.	
Winches	- -	- -	According to nature of material.	
Winding wool (goats' hair)	V.	18 *a.*	Free.	
Wine, in bottles and jars	VII.	27 *a.*	4 0	0 8 0
„ in casks and pipes	„	27 *b.*	4 0	0 8 0
„ medicinal	XX.	76 *a.*	15 0	1 10 0
„ spirit of	VII.	26 *a.* 1.	9 0	0 18 0
Wine lees, fluid	XXII.	80 *b.*	Free.	
„ „ dried	IX.	37 *a.*	Free.	
„ must	VII.	27	4 0	0 8 0
„ surrogates (substitutes), of no matter what ingredients or materials	„	27	4 0	0 8 0
Wire, leaden	X.	39 *b.* 2.	2 50	0 5 0
„ iron, polished	„	40 *f.* 1.	4 0	0 8 0
„ „ unpolished	„	40 *f.* 2.	2 0	0 4 0
„ steel, polished	„	40 *h.*	4 0	0 8 0
„ „ unpolished	„	40 *f.* 2.	2 0	0 4 0
„ iron, coppered, tinned, galvanised, covered over with lead	XVII	69 *a.* 1.	4 0	0 8 0
„ with a thin coating of copper. *See* Cast steel wire.				
„ wound in a spiral form, *e.g.*, for hose. *See* Iron Wares.				
„ tin	X.	43 *b.*	2 0	0 4 0
„ zinc	„	42 *b.* 1.	1 50	0 3 0
„ of other base metals	„	43 *c.*	4 0	0 8 0
„ covered over with india-rubber or gutta-percha, not coloured, painted, lacquered	XV.	62 *c.*	6 0	0 12 0
„ coloured, painted, lacquered	„	62 *d.* 3.	10 50	1 1 0
„ covered over with paper	XVII.	69 *c.* 2.	6 0	0 12 0
„ leonine, imitation	„	70 *c.* 2.	6 0	0 12 0
„ „ real gilt or plated	XIX.	75 *b.* 3.	25 0	2 10 0
„ gold, silver, and platinum	„	75 *b.* 1.	75 0	7 10 0
„ spun over with woven or textile stuffs	„	75 *b.* 1.	75 0	7 10 0

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	Class.	Section.	Austrian Currency.	English Value.
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Wire, brushes, for metal work, made of iron wire	XVII.	69 *a.* 1.	4 0	0 8 0
„ „ made of brass wire	„	70 *c.* 2.	6 0	0 12 0
„ wicker-work and cloth } common, of iron	„	69 *a.* 3.	2 0	0 4 0
„ „ } of iron, superior	„	69 *c.* 2.	6 0	0 12 0
„ „ other kinds	-	-	According to nature of material.	
„ strings, same as wire.				
„ ropes, of iron	„	69 *b.* 1.	4 0	0 8 0
„ „ of copper or brass	„	70 *c.* 2.	6 0	0 12 0
„ tack, iron	„	69 *a.* 2.	3 50	0 7 0
„ „ „ polished, lacquered	„	69 *c.* 2.	6 0	0 12 0
„ goods (of iron or steel wire)	„	„	6 0	0 12 0
„ „ others	-	-	According to nature of material.	
Wood	VIII.	29	Free.	
„ ashes, leached	XXII.	80 *b.*	Free.	
„ „ unleached	IX.	37 *a.*	Free.	
„ bronze, *i.e.*, real or imitation gilt or plated wooden wares	XVI.	64 *d.* 2.	6 0	0 12 0
„ cuts (wooden printing blocks)	„	64 *c.* 1.	1 50	0 3 0
„ vinegar (pyroligneous acid)	VII.	25 *b.*	0 80	0 1 7½
„ screws, of iron	XVII.	69 *b.* 2.	3 50	0 7 0
Wooden shoes (clogs)	XVI.	64 *a.*	Free.	
„ **wares,** *i.e.*, common, rough, uncoloured, only planed, not combined with other materials	„	„	Free.	
„ „ veneering and parquetry, not inlaid, cork-strips, stoppers, &c.	„	64 *b.*	0 75	0 1 6
„ „ wooden household furniture, inlaid flooring	„	„	0 75	0 1 6
„ „ coloured, stained, varnished, lacquered, polished, also combined with chip, reed, bulrush, cane, and basket wicker-work, iron (with the exception of polished steel), brass, glass or common leather	„	64 *c.* 1.	1 50	0 3 0
„ „ picture engraving plates of wood	„	64 *c.* 2.	Free.	
„ „ superior turners' and carvers' goods, wooden clocks for hanging up, and clock-cases, buhl-work, wooden, bronze, veneering, inlaid or covered, or pressed with paper or textures on one side; superior basket wicker-work, children's toys	„	64 *d.* 2.	6 0	0 12 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Wooden wares, all real gilt or plated wooden wares, and those with materials not coming under the category of petty or hard wares -	XVI.	64 *d.* 2.	6 0	0 12 3
„ „ fans, upholstered furniture (with or without covering) - - -	„	„	6 0	0 12 0
„ „ perambulators for children, with leather or upholstery work, not over 50 lbs. in weight -	„	„	6 0	0 12 0
Wool. *See* Sheep's Wool.				
„ tablets, of carded sheep's wool. *See* Raw carded Yarn.				
„ „ (pine wool wadding) - -	XII.	50 *a.* 1.	0 75	0 1 6
Woollen yarn, viz., carded yarn (produced from the shortest wool, spun in oil, and which looks as if small buttons were placed beside each other) raw - -	„	51 *a.* 1.	0 75	0 1 6
„ „ worsted yarn, hard, raw (also Ispahan yarn, although this is not spun with oil) - -	„	51 *a.* 2.	0 75	0 1 6
„ „ worsted yarn, soft, raw -	„	51 *b.*	4 0	0 8 0
„ „ coloured or twisted (in three or more threads) -	„	51 *c.*	6 0	0 12 0
„ „ of worn-out old woollen materials - -	„	51 *a.* 1.	0 75	0 1 6
„ **goods,** such as coverlets, Halina cloth, sailors' cloth (Sigona), rough cloths -	XIII.	54. *a.*	4 50	0 9 0
„ „ oil-cloths, press cloths (filtering cloths) -				
„ „ bottoms of sieves, and plaitings (ropes, cables) of horse-hair, not combined with other materials - - -				
„ „ hat cuttings, ends of cloth, carpets (rugs), of dogs', calves', and cow hair, felt (also tarred or lacquered), unprinted -				
„ „ coverings for rollers (endless felts) - -				
„ lattice and joined nettings, both uncoloured -				
„ hair soles, *i.e.*, inner soles for boots and shoes, of felt, also lacquered on one side - -				

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
			fl. kr.	£ s. d.
Woollen goods, milled, not printed and not worked up like velvet, unprinted felt goods, and carpets (rugs) not named under 54 *a.*	XIII.	54 *b.* 1.	15 0	1 10 0
„ „ girdles	„	54 *b.* 2.	4 50	0 9 0
„ „ like velvet, and all thick unmilled, not printed	„	54 *c.* 1.	35 0	3 10 0
„ „ all lace, button, and hosiery wares	„	54 *c.* 2.	35 0	3 10 0
„ „ woven like flannel, also milled, not printed even when they serve as carpets for covering floors	„	54 *c.* 1.	35 0	3 10 0
„ „ all thick printed goods	„	54 *d.*	35 0	3 10 0
„ „ mixed, clouded	„	„	35 0	3 10 0
„ „ thin, and tulles	„	54 *e.* 1.	50 0	5 0 0
„ „ shawls and shawl cloths, without admixture of silk	„	54 *e.* 2.	50 0	5 0 0
„ „ lace, and lace cloths	„	54 *f.*	60 0	6 0 0
„ „ embroidered	„	„	60 0	6 0 0
„ „ combined with metallic threads or spun glass	„	„	60 0	6 0 0
„ „ combined with no matter what materials, viz.:—				
those most covered	XIX.	75 *b.* 1.	75 0	7 10 0
other kinds	„	75 *b.* 3.	25 0	2 10 0
Works of art	XXI.	79	Free.	
Worm seeds	III.	13 *h.* 1.	0 80	0 1 7½
Wormwood brandy (absinthe)	VII.	26 *a.* 1.	9 0	0 18 0
„ extract of, sweetened	„	26 *b.*	15 0	1 10 0
„ „ unsweetened	„	26 *a.* 1.	9 0	0 18 0
„ liqueur (absinthe)	„	26 *b.*	15 0	1 10 0
„ plant	III.	13 *h.* 1.	0 80	0 1 7½
Wound and clyster syringes	XIX.	73 *b.*	Free.	
Woven goods, of fine wool mixed with sheep's wool	XIII.	54 *b.* 1.	15 0	1 10 0
„ „ mixed, clouded, same as the printed	„	54 *d.*	35 0	3 10 0
„ „ with impressed ornamentations of paper-pulp alone, or combined with cotton, or with wool-dust, same as the printed, even if it is not printed	„	54 *c.* 1.	35 0	3 10 0
Woven goods and textures, embroidered or combined with metallic threads or spun glass, made of cotton	XIII.	52 *d.*	60 0	6 0 0
„ „ of linen	„	53 *g.*	70 0	7 0 0
„ „ of wool	„	54 *f.*	60 0	6 0 0
„ „ of silk	„	55 *a.*	80 0	8 0 0
„ „ combined with other materials	XIX.	75 *b.* 1.	75 0	7 10 0

DESCRIPTION OF ARTICLES.	Austrian Tariff.		Duty per Cwt. of 110·25 lbs. avoirdupois.	
	Class.	Section.	Austrian Currency.	English Value.
Wrappers of Cashmere or Thibet with Shawl borderings. *See* Shawl cl.			fl. kr.	£ s. d.
Wreaths of natural flowers	III.	13 *h.* 1.	0 80	0 1 7½
„ of artificial flowers	XIII.	57 *c.* 1.	85 0	8 10 0
Writing pens, iron	XVII.	69 *c.* 1.	15 0	1 10 0
„ „ bone	XVI.	63 *b.* 1.	15 0	1 10 0
„ „ of base metals	XVII.	70 *c.* 1.	15 0	1 10 0
„ „ of gold and silver	XIX.	75 *a.*	75 0	7 10 0
„ „ gilt, plated	„	75 *b.* 3.	25 0	2 10 0
„ „ quill	V.	18 *c.*	Free.	
„ materials	-	-	According to their nature.	
Y.				
Yarn, worsted, hard, raw (*i.e.*, all those spun with oil, and which consequently have a strong smell of oil)	XII.	51 *a.* 2.	Free.	
„ „ soft, raw (never spun with oil, has a crisped appearance when held up to the light)	„	51 *b.*	4 0	0 8 0
Yarns, cotton	„	9 *a.* 2.	4 0	0 8 0
„ linen	„	0 *a.* 1.	0 75	0 1 6
„ woollen	„	51 *a.*	0 75	0 1 6
„ common, of jute	XIII.	53 *a.*	0 75	0 1 6
„ leoline. See Leoline.				
Yeast, natural	XXII.	80 *b.*	Free.	
„ compact (compressed lees), artificial dried	XX.	76 *d.* 1.	5 0	0 10 0
Z.				
Zaffer (mineral saphera, sesquioxide of cobalt, for colouring porcelain blue)	IX.	37 *e.* 3.	Free.	
Zinc, raw (also old, broken, and in waste)	X.	42 *a.*	Free.	
„ in sheets, plates, and rods	„	42 *b.* 2.	0 75	0 1 6
„ in wires and tubes	„	42 *b.* 1.	1 50	0 3 0
„ dross (also grey coloured mixture of oxidised and metallic zinc, grey oxide of zinc, second zinc white, zinc powder, zinc flowers, &c., &c.)	„	38 *a.* 2.	Free.	
„ ores	„	38 *a.* 1.	Free.	
„ cast, rough	„	42 *b.* 1.	1 50	0 3 0
„ „ other kinds	XVII.	70 *a.* 1.	4 0	0 8 0
„ powdered, metallic, zinc, dross, &c.	X.	42 *a.*	Free.	
„ acids, prussic, acetic, muriatic	XX.	76 *d.* 1.	5 0	0 10 0
„ sulphate of (white vitriol)	IX.	37 *d.* 1.	0 75	0 1
„ wares, common, *i.e.*, rollers, kettles, dishes, plates, pots, and other kinds of cooking apparatus not combined with other materials	XVII	70 *a.* 1.	4 0	0 8 0
„ wares, other kinds	„	70 *c.* 2.	6 0	0 12 0
„ white (pure oxide of zinc)	IX.	37 *f.* 2.	1 50	0 3 0

AUSTRIAN TARIFF OF IMPORT DUTIES.

CLASSIFICATION.

Class.	Section.	Description of tariffed Articles.
I.		**Colonial Produce and Southern Fruits.**
	1	Cocoa.
	2	Coffee.
	3	Spices.
	4	Sago, tapioca, as well as sago substitutes, and arrow-root.
	5	Southern fruits.
	6	Tea.
	7	Sugar.
II.		**Tobacco and Tobacco Manufactures.**
	8	Tobacco and tobacco manufactures.
III.		**Garden and Field Produce.**
	9	Garden plants and fruit.
	10	Grain and husk fruits.
	11	Rice.
	12	Flour and grit products.
	13	Plants and parts of plants (not mentioned in other sections).
IV.		**Animals.**
	14	Fish, shell-fish, and other aquatic animals.
	15	Cattle for slaughter and beasts of burden.
	16	Animals (not mentioned in other sections).
V.		**Animal Products** (not mentioned in other Sections).
	17	Skins and hides.
	18	Hair, bristles, and feathers.
	19	Meat.
	20	Honey, wax, and cheese.
	21	Animal products not specially named (and not mentioned in other sections).
VI.		**Grease and Oils.**
	22	Grease.
	23	Oils.
VII.		**Drinks and Eatables.**
	24	Beer and mead.
	25	Vinegar.
	26	Alcoholic liquids.
	27	Wine.
	28	Eatables (not mentioned in other sections).
VIII.		**Wood for Fuel, Building, and Industrial Purposes.**
	29	Wood.
	30	Coals and peat.
	31	Turners' and carvers' materials (not mentioned in other sections).
	32	Minerals (not mentioned in other sections).
IX.		**Drugs, Perfumery, Colours, Dyes, and Chemical Auxiliaries.**
	33	Medicinal and perfumery ingredients.
	34	Dyeing and tanning stuffs.
	35	Gums (also resins and gum-resins), and other not specially named juices of plants.
	36	Common salt.
	37	Chemical auxiliaries.
X.		**Metals, Minerals, raw and partly manufactured.**
	38	Ores.
	39	Lead.
	40	Iron.
	41	Quicksilver.
	42	Zinc.
	43	Base metals (not mentioned in other sections).
	44	Precious metals.
XI.		**Webs and Textures.**
	45	Cotton.
	46	Flax, hemp, Manilla-hemp.
	47	Sheep's wool.
	48	Silk.

Class.	Section.	Description of tariffed Articles.
XII.		**Yarns.**
	49	Cotton yarn.
	50	Linen yarn.
	51	Woollen yarn.
XIII.		**Woven and Textile Goods.**
	52	Cotton goods.
	53	Linen goods.
	54	Woollen goods.
	55	Silk goods.
	56	Oil-cloth, waxed muslin, and taffety.
	57	Clothing and millinery.
XIV.		**Goods made of Bristles, Chip, Cocoa-nut Fibres, Reed, Grass, Bulrush, Shavings, Cane and Straw, as well as Paper and Paper Wares.**
	58	Brush and sieve makers, wares.
	59	Goods made of chip, reed, cocoa-nut fibres, grass, bulrush, shaving, cane and straw plaitings.
	60	Paper and paper wares.
XV.		**Leather and Leather Wares, Furriers' Goods, and similar manufactures.**
	61	Furriers' goods.
	62	Leather and India-rubber wares.
XVI.		**Bone, Wood, Glass, Stone, and Pottery Wares.**
	63	Bone wares.
	64	Wooden wares.
XVI.—*cont.*		**Bone, Wood, &c.**—*cont.*
	65	Glass and glass wares.
	66	Stone ware.
	67	Pottery ware.
XVII.		**Metal Wares.**
	68	Leaden wares.
	69	Iron wares.
	70	Metal wares (not specially named).
XVIII.		**Land and Water Conveyances.**
	71	Ships and other water conveyances.
	72	Carriages and sledges.
XIX.		**Instruments, Machines, and Small Wares.**
	73	Instruments.
	74	Machines.
	75	Small wares.
XX		**Chemical Products, Colours, Grease and explosive Wares.**
	76	Chemical products and colours.
	77	Candles and soaps.
	78	Explosive wares.
XXI.		**Objects of Art and Literature.**
	79	Objects of art and literature.
XXII.		**Refuse.**
	80	Refuse.

III.—IMPORT REGULATIONS.

1. Besides the articles denoted in the Customs' Tariff as *free*, the following are *conditionally free*, i.e., if the conditions upon which the immunity from duty is based are fulfilled.

(*a.*) *All quantities of goods, which weigh less than* $\frac{5}{100}$ *of a Zollpfund*, or of which the total amount of duty does not exceed $1\frac{3}{4}$ *kreuzer.*

(*b.*) *The means of transport*, such as travellers' own carriages, the vehicles serving for the conveyance of passengers and goods; sledges and similar contrivances, if they bear distinct traces of having been used, and if it is proved that they really served for the transport of passengers or their goods.

(*c.*) *The covers and cases* in which the goods are packed, if they are not considered as part of the goods themselves, or are such as are not generally used for that purpose in commerce, or taxed at a higher rate than the goods themselves.

(*d.*) *Corpses, skeletons, and other anatomical preparations.* The spirit of wine, however, if they be preserved in such, is liable to duty.

(*e.*) *Objects destined for scientific and artistical Government Institutions*, if attested by them.

(*f.*) *The stores of ships arriving in port*, under existing regulations.

(*g.*) *Travellers' luggage*, in so far as it is only intended for the travellers' own use, and suitable to his requirements, position, and circumstances.

(*h.*) *Immigrants' goods and chattels*, in case the immigration or transmigration is proved by a certificate of the competent authorities.
However, all articles are liable to duty which show no signs of having been in use.

(*i.*) *Hereditary effects*, in so far as they are for the inheritor's own use, and are proved to be such by a certificate of competent authorities. Articles of consumption liable to duty, cattle, unworked or raw materials, are, however, not exempt from duty.

(*k.*) *Articles of outfit*, in so far as they are certified to be such by competent authorities.
Articles of consumption liable to duty, cattle, unworked stuffs, half manufactured goods, and raw materials are, as above, not exempt from duty.

(*l.*) *Agricultural and dairy produce* from estates separated by the Customs' frontier, subject to the existing regulations.

(*m.*) *Pattern-cards and patterns*, in cuttings and samples, if only adapted for such use.

(*n.*) *Manuscripts and Deeds.*

(*o.*) *Badges of Orders*, if their destination is proved by the respective diplomas or other certificates of competent authorities.

(*p.*) *Sacks* of the commonest sort of linen, if they bear marks of having been used.

(*q.*) *Gold and Silver wares* made at home, and provided with the monogram or trade mark of the maker, and the hall mark.

2. The goods enumerated in the Customs Tariff may be subjected to duty, without previous special permit.

The following articles are the only exceptions :—

(*a.*) Dried fruit painted with colours,

(*b.*) Utensils for victuals and playthings of a greenish colour playing into gold.

(*c.*) Medicinal preparations.
The importation of which is prohibited altogether.

(*d.*) Fulminic acid, gun-cotton, firewood cigars, and all explosive materials not specially named, and

(*e.*) The weapons declared as prohibited.
The importation as well as the transit of which is forbidden.

(*f.*) Tobacco (also stramony and iodine cigars), salt, and gunpowder,

(*g.*) Weapons, parts of arms, and articles of ammunition.
Are only allowed to be imported and passed in transit by special permission.

(*h.*) White pigment,

(*i.*) Children's toys, painted green,

(*k.*) Artificial flowers and their component parts, coloured green, and

(*l.*) Thin textures coloured with a strikingly beautiful bright green containing arsenic.
Can only be imported by special permission.

EXPORT REGULATIONS.

The following articles only, when exported, are subject to a duty of fl. 2·50 per centner, gross weight.

1. The raw skins and hides mentioned in section 17 *a.* of the Tariff, such as: bovine hides (*i.e.*, of bisons, buffaloes, calves, cows, oxen, bulls, &c.); equine (also of foals, mules, and hinnies), donkeys, camels, badgers, dogs, pigs, chamois, stags, deer, elk, and reindeer; hippopotamus and rhinoceros hides, common sheep's (also wethers', lambs', and sheep which have died of a disease), common goats (also buck and kid), hares' and rabbits' skins, and fish skins, raw.

a. Both under the favoured nations clause (as per treaty), as well as in general commerce.

2. The articles enumerated in section 80 *c.* of the Tariff, such as rags and other wastes used for making paper, *i.e.*, linen, cotton, silk, and woollen rags, also macerated (half prepared solid, and fluid paper pulp), paper cuttings (paper shavings), waste paper (written or printed on), likewise old nets, old cables, and old cords, are subject to a duty of fl. 2 per centner, gross weight; and—

b. Only in general commerce.

3. The bones mentioned under 80 *d.* (*i.e.*, bones, and bone dust, properly so called), claws, trotters, cuttings from hides (leather parings), 75 kr.

NOTE.

As regards the export of skins and hides not specially mentioned (Tariff 17 *b.*), and of pasteboard (Tariff 60 *a.*) in quantities above 1 centner, only the chief custom houses and subordinate customs' offices of the first class are allowed to treat with the exporter; but respecting the above-mentioned articles which are liable to duty, all first class subordinate customs' offices are authorised to attend to their passing.

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GROUP II.—AGRICULTURE, HORTICULTURE, AND FORESTRY.
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TEMPORARY EXHIBITIONS.

IV.—TABLES OF AUSTRIAN, ENGLISH, AND FRENCH MONEY, WEIGHTS AND MEASURES.

I.—Money.

In calculating the following Tables, the £ sterling is taken at 10 *Florins* Austrian silver standard (*Conventions Münze*), or 25 francs.

The Austrian monetary system is paper currency.

The rate of exchange varies according to the rise and fall in the price of gold. But in the Austrian Empire a Florin, or *Gulden*, is always a Florin, *viz.*, 2 shillings silver.

The Austrian *Waehrung* (paper currency, which is legal tender) is likewise continually subject to important fluctations. It is on an average 5 per cent. less in value than the usual *Conventions Münze;* so that the Florin in Austrian *Waehrung* would have the average value of 1*s.* 10·8*d.*

Accordingly the Value of the Current Gold and Silver Coins is:

	£	*s.*	*d.*
5 Kreuzer = $\frac{1}{20}$ part of a florin.	0	0	$1\frac{1}{5}$
10 Kreuzerpiece = $\frac{1}{10}$ „	0	0	$2\frac{2}{5}$
20 „ = $\frac{1}{5}$ „	0	0	$4\frac{4}{5}$
25 „ = $\frac{1}{4}$ „	0	0	6
50 „ or 10 silbergroschen	0	1	0
1 Florin, or *Gulden*, silver -	0	2	0
1 Thaler (Dollar) = 1 fl. 50 kr.	0	3	0
2 „ piece = 3 florins -	0	6	0
Gold:			
4 Florin piece (equal to 10 francs)	0	8	0
8 „ („ 20 francs)	0	16	0
1 Krone (crown) = 13 fl. 80 kr.	1	7	7
$\frac{1}{2}$ „ „ = 6 fl. 90 kr.	0	13	10
1 Ducaten (ducat) 4 fl. 80 kr. -	0	9	7
1 Doppelducaten (double ducat) 9 fl. 60 kr.	0	19	3

Paper Currency; present rate of exchange.

	£	*s.*	*d.*
100 Kreuzer = 1 florin.			
1 Florin, or *Gulden* =	-	0	1 $10\frac{1}{2}$
5 Florins =	-	0	9 $4\frac{1}{2}$
10 „ =	-	0	18 9
50 „ =	-	4	13 9
100 „ =	-	9	7 6

The notes issued by the Austrian National Bank are respectively 1,000, 100, and 10 florin notes.

Those issued by the Imperial Treasury are respectively 50, 5, and 1 florin notes.

Value of English Coins in Austrian Money.

1 Sovereign	= 10 florins	Austrian Currency in silver.			
$\frac{1}{2}$ „	= 5 „			„	„
5 Shillingpiece	= 2 „	50	kreuzer	„	„
Half-crown	= 1 „	25	„	„	„
1 Florin	= 1 „	0	„	„	„
1 Shilling	= 0 „	50	„	„	„
6 Pennypiece	= 0 „	25	„	„	„
4 „	= 0 „	$16\frac{1}{2}$	„	„	„
3 „	= 0 „	$12\frac{1}{2}$	„	„	„
1 Penny	= 0 „	4	„	„	„
Halfpenny	= 0 „	2	„	„	„
1 Farthing	= 0 „	1	„	„	„

MONEY TABLE.

Silver: £1 = 25 francs = 10 florins, Austrian Currency.

Austrian Currency.	English Equivalent.	French Equivalent.	Austrian Currency.	English Equivalent.	French Equivalent.	Austrian Currency.	English Equivalent.	French Equivalent.
fl. kr.	£ s. d.	fr. c.	fl. kr.	£ s. d.	fr. c.	fl. kr.	£ s. d.	fr. c.
0 5	0 0 1	0 10	1 0	0 2 0	2 50	20 0	2 0 0	50 0
0 10	0 0 2¼	0 23	2 0	0 4 0	5 0	30 0	3 0 0	75 0
0 20	0 0 4¾	0 47	3 0	0 6 0	7 50	40 0	4 0 0	100 0
0 30	0 0 7	0 70	4 0	0 8 0	10 0	50 0	5 0 0	125 0
0 40	0 0 9½	0 95	5 0	0 10 0	12 50	60 0	6 0 0	150 0
0 50	0 1 0	1 25	6 0	0 12 0	15 0	70 0	7 0 0	175 0
0 60	0 1 2¼	1 48	7 0	0 14 0	17 50	80 0	8 0 0	200 0
0 70	0 1 4¾	1 73	8 0	0 16 0	20 0	90 0	9 0 0	225 0
0 80	0 1 7	1 95	9 0	0 18 0	22 50	100 0	10 0 0	250 0
0 90	0 1 9½	2 20	10 0	1 0 0	25 0	1,000 0	100 0 0	2,500 0

Bank Notes, at the rate of exchange: 100 florins = £9 7*s.* 6*d.* = 250 francs.

Austrian Currency.	English Value.	French Value.	Austrian Currency.	English Value.	French Value.	Austrian Currency.	English Value.	French Value.
fl. kr.	£ s. d.	fr. c.	fl. kr.	£ s. d.	fr. c.	fl. kr.	£ s. d.	fr. c.
0 5	0 0 0¾	0 12½	1 0	0 1 10½	2 50	20 0	1 17 6	50 0
0 10	0 0 2	0 25	2 0	0 3 9	5 0	30 0	2 16 3	75 0
0 20	0 0 4	0 50	3 0	0 4 7½	7 50	40 0	3 15 0	100 0
0 30	0 0 6¼	0 75	4 0	0 7 6	10 0	50 0	4 13 9	125 0
0 40	0 0 8½	1 0	5 0	0 9 4½	12 50	60 0	5 12 6	150 0
0 50	0 0 11¼	1 25	6 0	0 11 3	15 0	70 0	6 11 3	175 0
0 60	0 1 1½	1 50	7 0	0 13 1½	17 50	80 0	7 10 0	200 0
0 70	0 1 2¾	1 75	8 0	0 15 0	20 0	90 0	8 8 9	225 0
0 80	0 1 5¼	2 0	9 0	0 16 10½	22 50	100 0	9 7 6	250 0
0 90	0 1 7¾	2 25	10 0	0 18 9	25 0	1,000 0	93 15 0	2,500 0

II.—Weights and Measures.

By the law of 25th July 1871, promulgated in the Imperial Law Repertory of the 2nd March 1872, the metric system of weights and measures has been legalised in Austria. Its use has been rendered permissive from the 1st January 1873, and it will become obligatory from the 1st January 1876.

Accordingly the *Measures of Length* will be :—

The meter, as unit.			
„ Decimeter	=	$\frac{1}{10}$	Meter.
„ Centimeter	=	$\frac{1}{100}$	„
„ Millimeter	=	$\frac{1}{1000}$	„
„ Kilometer	=	1,000	„
„ Myriameter	=	10,000	„

The Measures of Surface.

The Are	=		100 square meters	
„ Decare	= 10 Ares	=	1,000 „	„
„ Hectare	= 100 „	=	10,000 „	„

The Measures of Capacity.

The Litre	=	1 Cubic Decimeter.
„ Decilitre	=	$\frac{1}{10}$ Litre.
„ Centilitre	=	$\frac{1}{100}$ „
„ Hectolitre	=	100 „

Weights.

The Kilogram	=	(2 Zollpfund) as unit.
„ Decagram	=	$\frac{1}{100}$ Kilogram.
„ Gram	=	$\frac{1}{1000}$ „
„ Decigram	=	$\frac{1}{10000}$ „
„ Centigram	=	$\frac{1}{100000}$ „
„ Milligram	=	$\frac{1}{1000000}$ „
„ Ton	=	1,000 „

Comparative Table of Measures and Weights at present in use.

(A.) Austrian.	English.	French.
I.—*Measures of Length.*		
1 Ell (Vienna) à 29·578 inches - =	2 feet and 6·67 inches =	0·777 mètre.
1 Ell (Bohemian) à 22·548 „ - =	1 foot and 11·35 „ =	0·592 „
1 Foot (Fuss) = 12 inches, inch = 12 lines. =	1·0371 feet. - - =	0·316 „
1 Fathom (Klafter) = 6 feet - =	6 feet and 2·0742 inches = 2 yards and 2·67 inches.	1·896 „
4000 Klafter = 1 mile.		
1 Mile (post = 24,000 feet) -	= 8297 yards = 4·7142 miles =	7·585 kilomètre.
1 Inch (Zoll) = 12 lines - - =	1·0371 inches - =	0·026 mètre.
II.—*Measures of Surface.*		
1 Foot (square) = 144 square inches =	1·07 square foot - =	0·001 are.
1 Yoke (Joch) = 1600 square fathoms = (quadrat Klafter).	5·68 roods = 1·42 acre =	0·576 hectare.
1 Yoke (Hungarian Forest measure) = = 1200 square fathoms.	4·26 „ = 1·06 „ =	57·546 are.
	or =	0·575 hectare.
1 Fathom (square, quadrat Klafter) = = 36 square feet.	4·28 square yards - =	0·036 are.
1 Mile (square) - - - =	14200· square acres - =	5755·6 hectare.

Comparative Table of Weights and Measures—continued.

III.—*Measures of Capacity.*

1 Foot (cubic) = 1728 cubic inches = 7·0 gallons = 31·6 litre.
1 Fathom (cubic) = 216 cubic feet = 23·6 quarters = 6822·4 „
1 Metze = 16 Maassel = 1,9471 cubic feet = 13·6 gallons = 61·5 „

IV.—*Measures of Liquids.*

1 Eimer (beer) = 42½ Maass = 13·2 Imperial gallons = 60·0 litre.
1 Eimer (wine) = 41 „ = 12·76 „ = 56·6 „
1 Maass (Vienna = 2 Kannen = 1 quart and ½ pint = 0·3114 Imperial gallons. = 1·41 „
1 Kanne = 2 Seidel = 0·1557 Imperial gallons.

V.—*Weights.*

1 Loth = 4 quentchen = 270·2 grains = 0·0386 lb. = 0·017 kilogrammes.
1 Pound (Vienna) = 32 loth = 1,12002 = *Zollpfund.** 1·23 pound = 1 pound 3 ounces 11 drachms. = 0·560 „
1 Pound (tariff) = 1·10 pound = 1 pound 1 ounce 10 drachms. = 0·50 „
1 Cwt. (Vienna Zentner) = 5 stone = 100 pounds as used in trade. = 123·0 pounds 7 ounces 5 drachms. = 56· „
„ (tariff) = 110·0 pounds 3 ounces 10 drachms. = 50· „

(B.) ENGLISH-AUSTRIAN.

I.—*Measures of Length.*

1 Fathom = 5·78 Vienna feet.
1 Foot = 0·96 „ „ = 11·57 Vienna inches.
1 Furlong = 106·06 „ fathoms.
1 League = 979·2 „ „ = $\frac{74}{60}$ miles.
1 mile (English) = 804·86 Vienna fathoms = 1,666 yards.
1 mile, statute, = 847·7 „ „
1 Pole, perch, rod = 2·65 „ „
1 yard = 2·89 Vienna feet = 1·174 Vienna ells.

II.—*Measures of Surface.*

1 Acre = 1124·93 Vienna fathoms square.
1 Foot square = 133·9 Vienna inches square.
1 Rod square pole = 7·02 Vienna fathom square.
¼ Acre = rod acre = 281·288 Vienna fathoms square.
1 yard square = 8·35 feet square.

III.—*Measures of Capacity.*

1 Bushel = 0·59 Austrian metzen.
1 Chaldron = 21·27 „ „
1 Gallon = 3·21 „ maass.
1 Last = 47·27 „ metzen
1 Pint = 1·60 „ seidel.
1 Quart = 3·20 „ „
1 Quarter = 4·73 „ metzen.
1 Sack = 1·77 „ „
1 Wey = 23·63 „ „

(C.) FRENCH-AUSTRIAN.

I.—*Measures of Length.*

1 Kilomètre = 1000 mètres = 527·25 Vien fathoms.
1 Mètre = 10 décimètres = 100 centimètr = 1000 millimètres = 3·1635 Vienna fe = 1·28 Vienna ell.
1 Myriamètre = 10,000 mètres = 5272·4 Vienna fathoms = 1·3181 mile post.

II.—*Measures of Surface.*

1 Are = 27·80 fathoms square.
1 Hectare = 2780 „ „ = 1·7375 yoke.

III. *Measures of Capacity.*

1 Hectolitre = 10 decalitres = 100 litres. = 1·6259 Austrian metzen.
1 Litre = 0·130 Vienna achtel = 0·26 Austrian maassl.

* The "*Zollpfund*" is equal to ½ kilogram or 500 grammes; 100 "*Zollpfund*" make a "Zoll-Zentner" hundredweight) = 50 kilogrammes.

Comparative Table of Weights and Measures—continued.

ENGLISH-AUSTRIAN.

IV. *Measures of Liquids.*

1 Gallon = 3·21 Austrian maass.
1 Pint = 1·60 „ seidel.
1 Quart = 3·21 „ „

—	Wine, Spirits, Cider, Vinegar.	Ale.	Beer.
	= Austrian Eimer.		
1 Barrel -	—	2·57	2·89
1 Butt -	10·11	7·70	8·66
1 Firkin -	—	—	0·72
1 Hogshead -	5·05	3·85	4·33
1 Kilderkin -	—	1·28	1·44
1 Puncheon -	6·74	5·14	5·78
1 Runlet -	1·44	—	—
1 Tun -	20·23	15·42	17·34

V.—*Weights.*

1 Drachm = 0·10 Vienna loth.
1 Cwt. = 90·72 Vienna pounds,
1 Pound = 0·81 Vienna pound = 25·92 Vienna loth.
1 Quarter = 22·68 Vienna pounds.
1 Stone = 11·34 „ „
1 Ton = 1814·4 „ „
1 Ounce = 1·62 „ loth.

FRENCH-AUSTRIAN.

IV.—*Measures of Liquids.*

1 Litre — 10 decilitres = 100 centilitres = 0·71 Vienna Maass = 2·83 Austrian seidel.

V.—*Weights.*

1 Kilogramme = 10 hectogrammes — 100 decagrammes = 1000 grammes = 1·7857 Vienna pound = 1 pound 25·14 Vienna loth.

APPENDIX.

EXTRACTS FROM THE OFFICIAL REPORTS OF THE VIENNA UNIVERSAL EXHIBITION OF 1873, RELATING TO OBJECTS CONTRIBUTED BY BRITISH EXHIBITORS (published under the Authority of the Austrian Government, and translated for the Royal British Commission by J. W. Mollett, B.A.).

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APPENDIX.

EXTRACTS from the OFFICIAL REPORTS on the VIENNA UNIVERSAL EXHIBITION of 1873, relating to OBJECTS contributed by BRITISH EXHIBITORS (published under the authority of the Austrian Government, and translated for the Royal British Commission by J. W. Mollett, B.A.).

MINING PRODUCE, EXCLUDING FOSSIL FUELS.

Report of DR. FRANZ VON VIVENOT.

* * * * *

It is a very remarkable fact that it was precisely those countries which are rich in mineral produce of the most varied kind which were not well represented in the Exhibition, as from that circumstance they might have been, and were indeed expected to be; and this remark has reference more particularly to the United Kingdom of Great Britain, which sent but a scanty selection of her mineral produce to the Exhibition.

As at the Paris Exhibition of 1867, so also on this occasion, England exhibited no other produce of her mines but coal; on the other hand, her colonies were well represented.

East India is first to be noticed, and here coals and iron ores stand prominently in the foreground.

In the exhibited collection of mineral produce, which was initiated by the Institution for the Geological Survey at Calcutta, and collected by Dr. T. Oldham, the manager, and Mr. B. Foote, the geologist of that institution, salts occupied the front rank and attracted the greatest attention. First are to be noticed the numerous varieties of rock salt; hair salt (native sulphate of magnesia); blood red and stalactiform rock salt. There was a gigantic parallelopiped, the structure of which, by the liquidisation of the upper surface, was very plainly displayed. Instructive collections of sea salt and lake salt (the most celebrated salt lake is that of Sambar) were likewise exhibited; also of lumps illustrating the occurrence of rock salt with potassic salts in the salt range of the Punjaub, a deposit until now unknown.

The salt range in which the occurrence of salt has been known from antiquity, and from which at the present time India and Afghanistan draw their supplies, stretches in a north-westerly direction across the north of the Punjaub. The richness of the vein is there so considerable that at Kalabagh, where it appears exposed on the surface, the road was cut through the middle of the rock salt. A further peculiarity of this salt deposit is that it appears to be the most ancient of all yet known belonging to the Silurian formation. In recent times an appearance of salt was observed, in the salt works at Mayo, remarkable for its hardness, which showed, when closely examined by the Chemist Warth employed there, a considerable amount of magnesia and potash. The samples of this salt compound which were exhibited actually contained, according to the analysis made at Vienna by Professor Dr. Gustav Tschermak, silvine (chloride of potash) and sulphate of magnesia, and probably contained, in Professor Tschermak's opinion, cainite also, although he was unable to ascertain the presence of this with certainty.

Anhydrite, gypsum, glauberite, and Epsom salts were also in the collection. The annual production of marine salt amounts to about 12 millions of centners, and the revenue to the state derived from salt of all kinds is nearly 50 millions of guldens in Austrian currency.

Of the ores that were exhibited let us examine first the iron ores. India is rich in every kind of iron ore. For example, the mountain of magnetic iron at Kandschamally, near Salem, which is 400 feet high, contains visible deposits of this ore of a hundred feet in thickness.

There were also exhibited ores of copper and zinc, argentiferous galena, chromite, antimonite, sulphur, and graphite.

Samples of alluvial gold from various localities—nearly all the rivers of India are auriferous—were also to be seen. In many places the 100 centners of rubble render four loths of gold, but generally less than this. Small diamonds were exhibited from Pauna and Sumbulpur; spinel from the province of Mysore; beryl out of the river sand; beautiful specimens of apophyllite (*anglicé* fish eye stone) and desmine from Bor Ghat, in the neighbourhood of Poonah; an aventurine, of the colour of verdigris, from Madras; emery from Rewa (applied to a variety of purposes by cutters of precious stones); and, finally, mica from the Godavery district.

Among the useful rocks we notice alum, slate, and clay. Finally, the flexible sandstone of Kalyna, near Dadri, is of scientific interest. It reminds one much of the known Icatolumite (flexible micaceous quartz) of the Brazils and the Melaphyr (generally called basalt) of India, which is extended in horizontal strata over the whole of the Deccan, and occupies a superficial area equal in extent to that of the whole of the Austro-Hungarian monarchy. It is the greatest basalt formation hitherto known. Among the topographical works the geological map of the East Indian Peninsular is especially deserving of mention, as is the special map of the salt range of the Punjaub.

Thoroughly novel and in the highest degree interesting was the exhibition of the Cape Colony. The rich auriferous quartz from the newly discovered gold fields of the Trans-Vaal Republic were to be seen there. These render 70 ounces of fine gold per one thousand kilogrammes. Fourteen ounces of the gold were in the Exhibition. The diamond wealth of the Cape was illustrated by a collection of 31 rough diamonds, in which all gradations of form were to be found, from the completely spherical up to the most perfect white diamond crystal, represented by a stone of 16 carats. The world-renowned great Cape diamonds were illustrated by plaster models; the "Star of Africa" by a crystal glass model. The original of this diamond, valued at 200,000 guldens, in possession of Lady Dudley, celebrated for the costly jewellery which she brought to the Exhibition, was included in her collection. The Stewart diamond, 288⅜ carats in weight and 375,000 guldens value, was to be seen in the Exhibition of the Vienna jewellers, Kobek and Aegydi.

The copper mines situated at the debouchement of the Orange river were represented by ores from four mines. The copper contained in these ores was between 36 and 50 per cent. Many cargoes of the ore are annually shipped from Port Noloth for England.

Ceylon exhibited Graphite.

Australia sent a great variety of valuable exhibits. The most striking were the immense gold nuggets found in the colony of Victoria, which were illustrated by plaster casts. There was the gold nugget Welcome, 2,195 ounces in weight, found in the year 1858, at a depth of 180 feet at Bakery Hill, Ballarat, and the Viscount Canterbury, 1,105 ounces, brought to light in 1870 at a depth of only 15 feet in Join's Paddock, Berlin diggings. Statistical data gave particulars of the gold transactions, and we will only mention that the entire production since its discovery (digging began in Australia in the year 1852), amounts to about 2,000,000,000 of guldens. In the year 1858, the gold production of Victoria was already about three times in excess of that of the Ural mountains. The antimony from the colony, in compact masses of a fine close grain, is remarkable.

Queensland, which is the largest of the Australian colonies and forms the whole north-east of the continent, also presented a striking picture. The superficial area is 678,600 English square miles.

Especially beautiful was a great slab of malachite of similar figuring to the Siberian malachite, but darker in colour. A gold nugget, exhibited by the Government, and of pure gold, weighed 104 ounces, and the marks of the gold digger's pick were visible upon it. The beautiful opals are still to be noticed, many pieces of which surpass the Hungarian opals in fire; these appear in lumps of brown ironstone deposited in an extensive stratum of chalk, which forms the base of that immense eastern plain enclosed by the rivers "Rivers" and "Thompson." The occurrence of copper, lead, zinc, and of marble and other building stones deserves mention.

A practical completion of this exhibition of Queensland is formed by the views illustrative of the productions of the colony and the mode of life of its inhabitants, the work of Mr. Daintree, formerly geologist to the Colonial government. In these views it is shown how the life of its inhabitants depends on the geological formation of the soil.

New Zealand sent samples of alluvial gold from Otago, Nelson, and Westland, also auriferous quartz, rubies, and ruby sand, Dunite (the rock named Olivine by Hochstetter), Nephrite, argentiferous mica, iron and copper ores, soils, and skeletons of the New Zealand giant bird, the moa, from the Canterbury Museum at Christchurch, which is under the management of Dr. Julius Haast. To enable the reader to form an idea of the proportions of these giant birds it may be mentioned that the most important species are of the following dimensions. The giant moa (Dinornis giganteus) measures nine feet ten inches; the elephant foot moa (Palapteryx elephantopus)—which is more nearly related to the cassowary of New Holland than to the kiwi, the now existing species of New Zealand wingless birds—measures five feet nine inches; and the great moa (Dinornis ingens) five feet six inches; finally, the dodo, a kind of moa (Dinornis didiformis), four feet three inches. In the museum mentioned above there are also Dinornis crassus, robustus, and casuarinus. Most of the remains of these birds have hitherto been discovered in the neighbourhood of the spur of the mount Egmont, at the mouth of the river Maingongoro in Glenmark, and in the provinces of Nelson and Canterbury.

Gold dust was exhibited from the possessions in Western Africa.

* * * * *

SMELTING WORKS.

Report of FRANZ KUPPELWIESER, *Professor of the Science of Assaying and Smelting at the Mining Academy at Leoben.*

1. IRON SMELTING.

ENGLAND.

England takes the leading place amongst iron producing countries, not only providing for the immense home consumption of her own numerous iron works, but finding a market for her produce in almost every country of the world where the production of iron is inadequate to the requirements of consumption; and by this means she rules the iron market. In forming a correct opinion of the influence exercised by England upon the iron trade, the following statistical notes may be useful. In 1871 the production was 2,384,593,209 Austrian zoll centners of coal and 134,664,277 Austrian zoll centners of crude iron. Of the objects exhibited by England, (perhaps we may say of those exhibited by all countries), in the first group, that which attracted the greatest admiration was the exhibition of C. W. Siemens, C.E., although the objects exhibited were small in themselves and not calculated to attract the attention of the passer by. His exhibition was interesting and important for the *progress* to which it bore evidence, and because it illustrated a process of manufacture which is in all probability destined to play an important part in the development of the iron industry. Siemens exhibited models and drawings of furnaces and apparatus for the direct production of iron and steel from the ore, without the intermediate process of smelting it into crude iron in the blast furnace. Specimens of the iron and steel made by this process, in the form of unfinished loops, skelps, and steel produced by the remelting of these objects, were also exhibited. Allowing that the process as it is applied at present has advanced beyond the stage of preliminary experiment, we can nevertheless not concede that it is already brought to perfection. We will describe briefly the most important feature in the new process which Siemens is carrying on, partly at the Siemens steel works at Landore, partly in a smaller experimental furnace in a factory

near Sheffield. In the experiments that have been made since the year 1868, the following systems of arrangement of the furnace have been used in the order in which we detail them. Simple "Siemens-furnaces," as they are used for the Siemens-Martin process, in which very rich ore of Mokta, containing nearly 60 per cent. of iron, is dissolved in a bath of crude iron, the carbon and other impurities of the crude iron being oxidated by the oxygen contained in the ore. Limestone or another flux is added to promote the formation of slag. This method, which, however, had been carried on previously in several places, did not produce the desired results, because no material could be discovered for building a furnace that would adequately resist the action of the slag, which was generally rich in oxydulated iron. The decarburating was carried as far as possible, and the required degree of hardening then obtained by re-coking with manganesian spiegel iron. When this furnace, which is excellently adapted for the Siemens-Martin process, had been pronounced to be unsatisfactory for the purpose required, Siemens constructed the so-called cascade furnace, in which the ores are put with fluxes in the upper parts of the body of the furnace near to the gas-admitting port, smelted, and then run off into the two lower divisions of the furnace below, in succession; pulverised carbonaceous materials mixed with sortings of ore are then added and stirred in with rabblers. The reaction follows gradually, the iron oxides are reduced and the iron formed into a loop by hand labour, and taken out and shingled in the ordinary manner. But in all these experiments it was apparent that the reaction never followed perfectly unless the ore had been perfectly smelted. Even the addition of previously reduced ores led to worse results than those obtained by reducing the iron in already smelted ores. Although the results obtained with the cascade furnaces were not altogether bad, yet there was the drawback to this mode of work that, like the ordinary puddling process, it required a great deal of hand labour, for which reason Siemens ultimately reverted to the rotating furnace. The difficulties that always accompany the use of rotating furnaces were still more serious in the production of iron and steel directly from the ore; it was very nearly impossible to discover a material which could at the same time withstand the high temperature, and the action of the iron silicates of the slag. In the end, through the suggestion of Mr. le Chatelier, Siemens found a material in the Bauxites which has satisfied the required conditions better than anything hitherto tried. The better sort of Bauxites, according to a great number of analyses, which Siemens records, contains in a burned condition from 60 to 80 per cent. of argillaceous earth; 2 to 8 per cent. silicate, and the rest oxide of iron. The burned Bauxites are mixed with such a per-centage of fire-proof clay as forms a binding material with which the rotatory furnace can be covered over. The addition of from five to six per cent. of graphite serves to reduce the iron oxide of the Bauxite in the high temperature in order to prevent slagging. The coating of Bauxite is next covered over with a thin incrustation of slag, and this lining fastens itself so firmly during the use of the furnace that it is good to resist the mechanical wear and tear also. The course of the process is somewhat as follows: a rotatory furnace about nine feet in length and seven feet six inches in diameter, after being heated to a white heat with regenerative firing, is charged with 20 centners of hæmatite containing rather more than 60 per cent. of iron, the requisite flux materials are added, and the furnace at full heat is made to revolve slowly. The pieces of ore put in must not be larger than peas or beans. The fluxes are chosen according to the composition of the earthy parts of the ore, chalk or clay ironstone. A certain quantity of manganesian ores is always desirable. In about 40 minutes the ores are heated nearly up to the smelting point, and then 5 or 6 centners of small coal in pieces of about the size of a nut are put in, and the furnace is set in a quicker movement in order to bring about a thorough mixing of the ore with the coal. A rapid reaction supervenes; the oxide of iron changes to protoxide, which is smelted, and coming into contact with the pieces of coal, is converted into iron, whilst the earthy ingredients of the ore are slagged with the flux. Hereupon the furnace is made to revolve with increased rapidity, so that the upper surface is continually changed and the iron brought into contact with the flame and the heated walls of the furnace. During this time, carbonic acid

gas is liberated from the mass of ore and coals, which is consumed by hot air, the entrance of gas from the generators being cut off. When the evolution of gas ceases, the reduction of the ore is nearly completed, and the rotatory furnace is made to revolve in such a manner that the slag can be let out by the tapping hole. In case loops have been formed the furnace is made to revolve more rapidly, in order that the iron may conglomerate more perfectly. The operation seldom lasts longer than two hours, and about 10 centners of iron are produced. Under these conditions one such furnace would produce a hundred centners in the day. If anthracite or hard coke is used for the reduction it must be pounded into very small pieces, which is not necessary in the use of coal or brown coal. The iron, which frequently contains imperfectly consumed lumps of coal, is not often beaten into rod iron immediately; but in general is either re-smelted in the rotator with a supply of spiegel iron at an increased temperature into steel, which is then likewise tapped, or the loops are dissolved in a fluid bath of raw iron in a Siemens-Martin furnace, which yields a still better result. The combination of these two processes appears at present to give the best results, and to be that which is most generally adopted in the Landore Siemens works. With reference to the quantity of fuel consumed in carrying through this process, this is less even on theoretical grounds in Siemens' system than in the blast furnace, because it admits a more complete consumption of the fuel, the gases being allowed to escape from the furnace after their combustion, whilst in the high furnace the gases are continually in contact with the coals and contain a preponderating quantity of carbonic acid gas, and indeed must contain this in order to the complete reduction of the ore. On the other hand in the high furnace the gases escape at a temperature of 350 degrees, whilst they rush out of the smoke pipe in Siemens' process at 150 to 175 degrees at the most. Siemens calculates theoretically that the consumption of fuel in the production of steel and soft iron from hæmatites should be considerably lower than he has hitherto found it in his practical experiments. His data are given in the following tables:—

For the production of one ton, the consumption of carbon, theoretically calculated, amounts to 8·91 centners for steel, 6·4 centners for soft iron.

For the production of one ton, the consumption of good coals, theoretically calculated, amounts to 11·00 centners for steel, and 8 centners for soft iron.

The actual consumption at Landore and Birmingham amounts to 12 centners for steel and 14 centners for soft iron, per ton of iron produced.

According to the statements of the exhibitor, the process has the further advantages that it requires little hand labour, and that even out of ores containing a considerable quantity of sulphur and phosphorus, iron can be made which contains but a little of these impurities. This process has up to the present been carried on at an experimental foundry at Birmingham, and at the Landore Siemens Steel Works near Swansea, and is about to be introduced at the works of Vickers and Sons and Charles Cammel and Co. in Sheffield, and at the Dowlais Steel and Iron Works. Steps have also been taken for its introduction into Austria, and the Huttenberg Iron Works Company have constructed a furnace at Pravali, which they intend to put into active operation in a very short time. The Landore Siemens Works exhibited a loop, skelps, tyres, axles, rails, &c., produced by the method described above. The Iron Works annually produce nearly four million centners and employ about 4,000 workmen.

A second specimen of progress is exhibited in No. 3 of Group 1 of the English section by Th. Whitwell, who represented, by means of models and designs, the hot blast apparatus that he has been constructing for some years past. We take leave, in consideration of the importance of these objects, to devote a few words to them. They are based on the principle of Siemens Regenerator, but differ from the old blast-heating apparatus of this description in the material point, that instead of brickwork gratings there is a series of contiguous chambers of fire-proof masonry which collect the heat and give it off again to the blast, which is led through the heated chambers. This modification facilitates the cleaning of the chambers without the necessity of allowing the apparatus to cool down. The time required for cleaning the chambers, including that occupied in stopping and setting in motion the apparatus, is only six hours. The temperature of the blast can without difficulty be raised to

700 degrees of Celsius, a temperature at which none of the cast-iron apparatus can be maintained in working order for any length of time. No wear and tear is caused, and no deterioration incurred by the burning of the cast-iron. The apparatus, in riveted metal casings are perfectly air-tight, and by their great cubical capacity are at the same time a substitute for the blast regulators. By the high temperature that can be given to the blast, a considerable economy of fuel is promoted, in addition to the production of a better quality of crude iron, because the high furnace process can be carried on at a higher temperature with a larger mixture of chalk. At least three such apparatus are required for every high furnace, and it is better if there are four—the number that is always found in larger furnaces. For high furnaces of such dimensions as to produce about 1,000 centners daily, each of the four apparatus is made of 6·7 metres diameter and 8·3 metres in height. Although most persons interested in this manufacture are convinced of the great advantages furnished by these apparatus, yet the principle objection that one hears raised against their introduction is that their first cost is too heavy. Blast heating apparatus, however, for such large blasts and high temperatures are expensive, if one adopts the cast-iron pipe apparatus, which are subject to a very large waste. But the following statement may serve to afford an idea of the cost of such an one as that described. For the construction of each such apparatus in France there was required:—

Metal casing 8 millimetres thick including armature	500	zollcentners	at	30	francs	= 15,000 francs.
Wrought-iron pieces	22	„	„	50	„	= 1,100 „
Steel springs	2	„	„	100	„	= 200 „
Cast-iron	116	„	„	15	„	= 1,740 „
Worked castings	105	„	„	25	„	= 2,625 „
Rubber pipes	0·30	„	„	50	„	= 15 „
Fire-proof bricks, 1st quality moulded bricks, 1,329 in tale = 218 cubic feet						1,720 „
Fire-proof bricks, 1st quality ordinary, 28,320 in tale = 1,330 cubic feet						2,832 „
Fire-proof bricks, 2nd quality, 44,700 in tale = 2,101 cubic feet						3,570 „
Ordinary bricks, 26,600 in tale = 1,255 cubic feet						530 „
Foundation, circa						2,833 „
Total cost						3,2165 „

or about 12,900 florins, Austrian currency, in silver.

In England, each such apparatus of the last that were constructed there cost 1,309*l.* sterling = 13,000 florins Austrian currency in silver. The firm of Head, Wrightson, and Co., of Teesdale Iron Works, near Stockton-on-Tees, delivers apparatuses complete for four furnaces, but without the brick masonry, for 40,000 thalers, an amount disproportinately in excess of the quotations given above. The reversal of the valve takes place about every third hour. It should be mentioned that the apparatus is already very extensively used, there being, in 57 high furnaces, 58 apparatuses in activity, and 161 in course of construction; so that in a very short time there will be 219 apparatuses at work in blast furnaces. The fact that the more grey pig iron you wish to produce the more important is the use of the hot blast is only too well known.

The iron industry of England in general was very poorly represented, and the next objects that arrested our attention were some crucible cast steel manufactures of Sheffield from Robert Smith and Company, John Kenyon and Company, and Wilson, Hawksworth and Company. These firms exhibited cast sheet steel, cold rolled steel, cast steel in ingots, and manufactures from steel, such as railway springs, files, wire, tools, &c., very beautifully exhibited. Other manufactures that also merit our notice are those of Brown and Company, of Wednesbury in Staffordshire; and of James Russell and Sons, also of Wednesbury, and wrought iron tubing of excellent quality exhibited by Budde and Company, of Birmingham. Brown and Company, of the Wednesbury Tube Works arranged their exhibits in order according to the quality of the material employed in their production, and exhibited tubing of wrought

iron, boiler tubes of charcoal iron and homogeneous metal; and James Russell and Sons (Crown Tube Works, Wednesbury), sent tubing with cross sections of the greatest variety to the Exhibition. Budde and Company, of Birmingham, and E. P. & W. Baldwin, of Stourport, exhibited very beautiful specimens of black and white sheet iron, galvanised sheet iron and iron wire. E. P. and W. Baldwin especially had sent samples of a quality that is only to be produced with sheet metal of the most excellent kind. We have still to allude to the exhibition of the Bowling Iron Company, of Bradford, in Yorkshire; in which we found very beautiful ornamental steel castings, axles, iron tires, (the last being bent cold), very fine puddling iron, and round bar iron and boiler plates. Very fine specimens of smith's work in the form of anchors made on the patents of Wasteneys Smith, and Martin, are also to be mentioned.

Thomas Firth and Sons, of Sheffield, exhibited pieces of cast-steel for projectiles, forgings for artillery of steel and homogeneous metal soft and hardened. The hardening takes place in oil, and the exhibitor was at pains to illustrate the advantages of the hardening by means of the accompanying results of experiments of the tensile strain and elongation of the homogeneous steel. The resistance can be perceived in the following figures:—

	Tensile strain per square inch.	Inches of elongation per 2 inches in length.
Soft steel - - -	35·55 tons -	- 0·271
Core of a cannon soft -	28·53 „ -	- 0·027
„ „ hardened	46·37 „ -	- 0·175
„ „ „	42·03 „ -	- 0·188

The armour plates exhibited by Cammell of the Cyclops Iron Works, and those by Brown, of Sheffield, were interesting. The Cyclops Iron Works exhibited an armour-plated wall for the Prussian ship of war "Borussia" of about 6 feet in width, 18 in length, and 6 inches thick, and weighing something over 320 zollcentners finished. To illustrate the strength of their manufacture both these exhibitors showed armour-plates that had been shot into with pointed and round shot, which established the certainty of aim of their artillery as well as the quality of the armour plates. Four shots with pointed projectiles which fell together on a surface of nearly two square feet and penetrated nearly six inches deep, caused, in one of Brown's armour-plates of 9 inches thickness, only a slight indentation and unimportant fractures at the back. Four similar shots on one of the armour-plates of Charles Cammel and Company (Cyclops Iron Works), caused an indentation which was just perceptible at the back. Armstrongs exhibited guns with steel cores, which were armed with iron rings and iron pipes, amongst others one breech-loading 9-inch gun of 290 centners, and a 10-inch barrel of 360 centners in weight. The details that he exhibited in illustration of the manufacture of the wrought-iron pipes were instructive; there was a bar made of thin plates welded together and rolled into tubing of about 6 and 4 inches, also an armour-ring welded, turned and exposed so as to illustrate the excellence of the welding. Richard Johnson, Clapham, and Morris, along with a large assortment of wires and wire manufactures exhibited a telegraph wire of 1619 metres in length, which weighed 638 zoll pounds, and was made from one piece. We have still to mention the manufacture of Edward Clarke, who exhibited very beautiful samples of straight shafts and shafts bent out of round bars; also the Kirkstall Forge Company at Leeds, who showed tires, steel axles, and an assortment of specimens of all of which the quality was excellent.

The branches of the iron manufacture in which England has progressed since 1867 are chiefly in the practically advantageous increase of the size of her blast furnaces, the introduction of the use of blast at a high temperature, for the production of crude iron of a good quality with the least possible expenditure of fuel. The Bessemer process is steadily increasing in popularity since the expiration of the patent. But that which deserves to be mentioned in the first place is the effort made by Siemens for the production of steel or bar iron directly from the ore. If this is not yet to be regarded as brought to perfection, it is still impossible to deny that the results already obtained justify

the hope that the solution of this question will be found at no very distan time.

The colony of Victoria exhibited an iron bell made at Ilfracombe, in Tasmania, which was shown without further explanation on an extremely primitive stand of wrought iron.

British India.

This country appears, if we judge from the objects exhibited, to be in no want of mineral fuel nor of rich and pure ores: it should therefore be in possession of the fundamental requirements for the prosperity of iron manufacture. The produce of mineral coal is not inconsiderable at present, it already exceeds ten millions of centners annually and the general quality of the coal is very good. The coals of Chanda, Rannegange produce very good coke, and whilst those of the Punjaub belong to the nummulites, those of Majo Sall are of the Tertiary formation. There is no scarcity of iron ore, very large deposits are known to exist in Madras, in the district Salem near Godumulay, at Karnul, Kadapay, at Kunjamullay near Sooramunglam and several other places, but they are little or not at all worked. The beginnings of a large iron industry have once already existed in India, but all the undertakings resulted in gradual failure, probably because they found no support in England, so that now there is nothing of the sort to be found but the ruins of former blast furnaces. The iron production is limited to bar iron and steel direct from ore on the most primitive and ancient systems of manufacture. The Local Committees of Mysore and Madras exhibited small models of the block furnaces used in the country about 4 feet in height, and each of them fanned by three blasts kept in motion by manual labour. The loops produced are about 50 pounds in weight, these are hacked in pieces and hammered out into bars of 12 to 15 inches in length. The cast steel smelting crucibles exhibited were very small, 4 to 5 inches high, 3 inches broad, and the cast steel buttons added from Mysore weighed about half a pound. The steel is not run out and the cast steel buttons showed a peculiarly marked grain on the surface. The production of Wootz steel (Indian steel) is limited to a few districts of Mysore and Salem in Madras, and is said to be got from magnetic chromate of iron. The system of its production is maintained strictly secret by the natives, even the places in which it is produced being scarcely known with certainty.

Concluding remarks.—In the method of carrying out the high furnace process we find little that is new, but substantial improvements and extensions of the system. The principal part of these is directed to an increase of production by increasing very considerably the cubic contents of the blast furnaces. For this purpose the dimensions of the furnaces have recently been increased in the direction of breadth rather than of height, and improved results have thus been obtained. The quantity of 1,600 to 1,700 centner per furnace per day, formerly produced in England only by strenuous effort, is now equalled in many parts of Germany. A substantial progress has been made by the use of the very hot blast. The introduction of Whitwell's blast-heating apparatus enables manufacturers to bring the blast into the furnaces heated to a temperature of 600 to 700 degrees Celsius, by which a material saving of fuel is effected and a quality of crude iron can be produced in many instances which is better adapted to many refining processes. The quality of the sorts of crude iron produced has in general improved. The endeavour to produce grey crude iron of a quality fit for the Bessemer process has in many places led to very successful results. In the same way it it no longer only in the Siegen works that we meet with the regular production of spiegel iron; Sweden, Austria, and France produce spiegel iron with a generally uniform and fairly high proposition of manganese. It is true it is not yet very much, but still it is enough to supply a trade. Ferro-manganese is no longer produced as a rarity but as a regular part of smelting in blast or Siemens furnaces. The substantial progress that meets us in this Exhibition is shown by Siemens in the English section in his exhibition of furnaces and apparatus for the direct production of iron from the ore in the puddling furnace. Although this process has not hitherto turned out from the ore a finished useful material, yet a production is obtained on the system of Siemens which resembles the puddling loops. This is a valuable material for the Siemens-Martin process, which is only

now beginning to become worthy of its name. If the statements given of the results obtained are correct the high furnace process can be in many instances avoided, but judging only by what has been hitherto accomplished it will never be entirely superseded. This process will probably enable all those countries which, having rich stores of ore, have only recent formations of coal at their disposal to increase their production of iron. The process will be also important in those iron districts which have ores containing phosphorus to work, as according to Siemens' statements the separation of the phosphorus is very completely effected. But this process will not be adaptable to all places (I will not mention here the numerous difficulties that always arise, and are often very serious, in the introduction of any new system), because it is only calculated, at least up to the present time, for the working of really rich ore. It is not to be denied that if this process finds fairly universal adoption, it marks an epoch in the iron industry. We recommend Mr. Siemens not to demand too high a royalty upon the application of his patent, that he may not fare in this instance as he has with the introduction of his certainly excellent system of firing. For Austria, above other countries, the introduction of this system may be singularly beneficial.

In the process of puddling we find in the models of the furnaces of Danks and Seller the means of replacing a part of the manual labour by machinery. The only novelty presented by any of these furnaces is to be found in their arrangement, but the principle that they illustrate has previously been experimentally applied in many places. The use of the Siemens furnaces has taken hold in England and Austria more than in other countries, and substantial progress has been made in their construction, and especially in the method of generating gas. The progress that is shown in the manufacture of steel is also not inconsiderable, and lies principally in the processes of Bessemer and Martin, which deserve to be particularly mentioned. It is only within the last five years that the Bessemer productions have acquired the full confidence of the consumers of iron.

Gold and Platinum.

All that relates to the production of gold we found predominantly in the exhibitions of Queensland, New Zealand, and Victoria, represented by plaster models of nuggets of gold discovered there, and by bars of gold and auriferous quartz. The yield, for example, of the separate gold-fields in Queensland was as follows :—

		Centners.	Per cent.
In Gympie	in an average of	405,000	0·00816
„ Ravenswood	„ „	32,000	0·00917
„ Charters Town and Broughton	„ „	200,000	0·0178
„ Gilbert	„ „	7,200	0·0073
„ Etheridge	„ „	30,780	0·0076

In Victoria the yield of gold from the working of 18,500,000 centners of quartz amounted to 0·0037 per cent. The diggings for gold are often carried on at a depth of much more than 100 fathoms, and extensive water lifting and winding engines are in consequence required to be brought into use, and are everywhere to be seen where the gold is no longer found in the upper strata of the alluvial. Gold, as exported from New Zealand, is usually composed as follows :—

Gold	from	96·27	to 65·65	per cent.
Silver	„	3·63	„ 33·90	„
Copper	„	0·1	„ 0·45	„

The silver is generally nearly all lost in the process of refining with chlorine.

Demoutis, Guenesser and Company of Paris, Johnson, Matthey, and Company, of London, and Herrens of Hannau, all exhibited apparatus and vessels for chemical manufacture and laboratories, amongst which especially worthy of notice is a boiler for the production of sulphuric acid, exhibited by Jonhson, Matthey & Co., which is constructed to deliver 200 centners per day, and costs 43,000 florins. We must also mention a piece of hammered platinum, of 4,728 grammes weight, palladium and iridio-platinum, the last material being especially well adapted for measures and weights for international use.

CHEMICAL MANUFACTURES.

Report by DR. A. BAUER, *Professor at the Polytechnic Institute at Vienna, &c.*

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Manufacture of sulphuric acid.—The concentration of the acid at 66 degrees Reaumur, is nearly always done in platinum vessels. The peculiarly constructed glass retorts introduced some years ago in England have fallen into disuse; this is attributable to the important reduction that has occurred in the price of platinum during the last 15 years. The improvements that have been made in platinum retorts by Johnson, Matthey, & Co., of London, and by Desmoulis and Quennessen, were represented in the Exhibition, and will be noticed in another report (by J. Stingl), along with the system of the Belgian de Hemptinne, which is based on the use of the vacuum.

The manufacture of soda.—The erection and use of rotating soda ovens in England was the subject of exhaustive consideration, especially by G. Lunge (Dingler's Journal, cxiv., p. 229). These ovens have come into frequent application in Lancashire and in the neighbourhood of Newcastle, and with the rise of the prices of coal and wages are steadily gaining ground in England. Many attempts have also been made for the preparation of soda by other methods. Setting out from the theory that sulphide of soda is in many cases a substitute for soda, Jean has recommended the production of this from sulphates, heavy spar and coal, and Lunge reports (Dingler's Journal, cciv. 310), that sulphide of soda is produced in one English manufactory with carbonate of soda, and the hydrothionic gas evolved is used for the precipitation of copper. The process of producing soda or caustic soda, by a principle already known in the last century, with protoxyde of lead or with lead has been much experimented on during the last five years, as for example by Backe (Chemical News 1869, No. 495, page 262), by whose method Clapham (Dingler's Journal cxcvi, page 469) says that very successful attempts were made at the Walker Alkali Works, Newcastle. But the process was varied by the addition of slacked lime to the mixture in order to re-convert chloride of lead into oxide of lead.

Manufacture of chlorine.—The production of chlorine, and of chlorates by means of chlorine, is almost universally a branch of soda manufacture by Leblanc's process, and the last five years have produced a series of most important studies and progress in this branch of manufacture.

The proper raw material for the production of chlorine is the muriatic acid that is produced in the preparation of the sulphate, and the perfect condensation of which is an object of the greatest solicitude to the manufacturer and the governments of some countries, especially England. In this country, the process is regulated by a law which came in force in 1864, and is called the Alkali Act, and it has been strikingly shown during the last few years that this law has the most beneficial effect on the manufactories themselves as well as their neighbourhoods, and wishes have frequently been expressed for a further extension of the regulations introduced by that law. The progress that has been made recently in the preparation of chlorine has taken two directions. On the one hand it has been attempted to utilize the manganese that is used in great quantity in this process (especially to reproduce it from the ashes), and on the other hand entirely new methods of preparing chlorine have been sought without the introduction of manganese. Of the various processes for reproduction of the manganese the first to be mentioned is that of Weldon. This process may be regarded as a modification of that of Dunlop, carried on in the large manufactory of Tennants at Glasgow, &c. &c. (Dingler's Journal cci. p. 354.)

The uses to which chloride of calcium can be applied are out of all proportion to the masses in which it is produced, and we find no material progress in this respect in the Exhibition. The artificial stone produced by Ransomes partly of chloride of calcium and the gypsum (analine) produced by several firms, especially the Stassfurt Factory, may be named as a cheap supplementary article of manufacture.

England. The chemical manufacturing industry of England, magnificent in its proportions and most fortunate in the conditions of its developement, was very inadequately represented at the Exhibition. This industry, in England as well as in other countries, has had many difficulties to overcome in the course of the last 10 years, of which the most sensibly felt has been the rise in the value of coals. But upon the termination of the American war, there sprung up in the transatlantic market a demand for colossal quantities of soda, the consequence of which was a rapid enlargement of the English manufactories, and a return of English products to the markets in Germany. The levy of a high duty on the importation of soda in America had suddenly deprived the English manufacturers of the American market, and they were compelled to return again to Germany, where in the meantime great manufacturing establishments had been founded and the competition had become severe. Under these circumstances the rise in the price of coal and in wages must have been peculiarly distressing to the chemical manufacturer, but it has not impeded in the last few years a renewed increase of the quantity of English manufactures.

Statistical statements* show, moreover, that the value of the exported products of chemical industry during the last years has again considerably increased: in 1860 this amounted to 801,231*l.* sterling, in 1864 it declined to 584,234*l.*, and, increasing from 1866, rose in 1872 to 1,863,634*l.* The imports increased at the same time also largely: they amounted to 339,930*l.* in 1860, and to 959,502*l.* in 1872. The important novelties introduced into chemical manufacture in England in the course of the last five years, and principally directed to the production of chloride have been already mentioned above.

Among the English exhibitors in the first section we mention the manufactory of the Newcastle Chemical Works Company, Limited, 4, Quay Side, Newcastle-on-Tyne, which has been in existence since 1834, and was formerly carried on by the firm Allhusen & Co., but on the 1st January 1872 was transferred to the existing company. This is one of the largest manufactories in England, and produces every week 12,000 centners of soda.

Then there is the Runcorn Soap and Alkali Works Company, Runcorn, which exhibited besides soap the most important products of wholesale chemical manufacture.

The factory of John Hutchinson and Company, Widnes, Lancashire, which was founded in 1815, was the first to introduce L. Mond's process for recovering sulphur. This firm exhibited sulphur made by this process, and Mond's whole process was illustrated with designs and samples of manufacture in the English Exhibition of "the use of waste materials and their products."

J. Berger Spence, & Co., of London† exhibited alum, phosphate of ammonia and ammonia phosphate manure, which this firm obtains from natural alumina phosphate (rodondo phosphate) by decomposition with sulphuric acid and treatment of the solution with ammonia. The easily crystallising ammoniac alum crystallises herefrom, the process being hastened by refrigeration down to five degrees, and phosphate of ammonia remains in solution.

The exhibition of the British Seaweed Company, Limited, Whitecrook Chemical Works, Dalmuir, near Glasgow, was peculiarly interesting. The business of this company is the utilization of kelp (the produce of seaweeds when burned, from which carbonate of soda is obtained) on the well known method of Stanford, which consists in first the carbonisation of seatangle in sealed retorts, collecting the distilled product, and obtaining the carbon through water. The carbon that is left is now used for disinfecting cesspools; it is simply thrown into them and taken up with the fœces. These, thus mixed with carbon are dried and distilled, by which ammonia is obtained, and the carbon is prepared to be used again. When it has been used in this process a number of times, it becomes an excellent manure, on account of its richness in potassic salts and phosphates, and it is especially valuable

* Statistical Abstract for the United Kingdom, 20 Numb, London 1873, p. 59.
† 108, King Street, Manchester, Catalogue.

if it is mixed with the ammonia obtained in the distillation, and carried over in sulphate. All the preparations illustrative of the above processes were exhibited.

We must also mention here the beautiful exhibitions of the English manure manufacturers in the West Agricultural Hall. Amongst others particularly Edward Packard & Co., Ipswich, with a rich collection of natural phosphates, and the London Manure Company, 116, Fenchurch Street, London, and especially the firm James Gibbs & Co., 16, Mark Lane, London, with factories in London, Plymouth, Newport, and Bristol. This firm owns a large manufactory of sulphuric acid in which, from pyrites and from sulphur, about 600,000 centners yearly is produced. The exhibitors Wilkin and Clark, 44, Finsbury Circus, London, exhibited bichromate of potash, which was peculiarly interesting to us because it was obtained from Hungarian chrome ore. This is the ore of the works Hofmann Ernest, in the parish of Alt Orsowa, the ancient Roman military frontier, which was accidentally discovered by Hofmann about 16 years ago, on a hunting excursion, and is shewn by repeated analysis to contain 83 to 52 per cent. protoxide of chromium. The ore has recently been purchased by the above-named English firm.

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EXPLOSIVE MATERIALS.

Report by Dr. Wilhelm Friedrich Gintl, *Professor of Chemistry at the German Polytechnical Institute, Prague, &c., &c.*

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Improvements in other respects have also been introduced. H. Howse of London, for example (1869), made the suggestion that the danger of fire with which the use of lucifer matches is attended, from burnt matches thrown away continuing to glow, might be counteracted by saturating the wood with substances such as alum, bitter salt, &c., which prevent the glowing of the wood after the extinction of the flame; a suggestion in some respects well deserving consideration, and already carried into practice. Finally, the machinery for cutting the wood has undergone improvements in the last few years (W. Jettel, 1869), and also the machines for dipping and taking out; and as a sign of increased care for the well-being of the worker we have to hail Bell and Higgins' self-acting "dipping machine," in the introduction of which the celebrated lucifer manufactory of Bell and Black at Stratford set a praiseworthy example, which has now at last found imitators in other manufactories.

Bryant and May exhibited their well-known Vesuvians.

The interesting product of the effect of nitro-sulphuric acid upon cotton, to which its first discoverer, in the sanguine hope that the new preparation would be a perfect substitute for gunpowder, gave the name of "gun cotton," had not up to a recent date fulfilled the expectation that he indulged. It was unfavourably judged by the committee of French experts appointed in 1846 to pronounce on its applicability as a projectile agency, and in spite of the more favourable opinion subsequently expressed by the German committee of inquiry, its use for this purpose has never received general approval. The detrimental effect it had on gun barrels in consequence of its rapid explosion, and the difficulty of producing a preparation uniform and equal in its effect seemed to make its application to projectiles impracticable. But the great advantages which it offered for blasting purposes turned attention to this method of utilising it, and Austria especially, where gun cotton of excellent quality was produced by General von Lenk's process, introduced it as a blasting agency for the engineers and artillery (for shells, &c.). But even to its application in this capacity no small objections were raised, the weightiest of which were based on the fact, which in the meantime had been established beyond doubt, of its liability to spontaneous combustion. In spite of this the attempt to utilise, for military purposes, the attractive advantages offered by gun cotton was not abandoned, and it was sought by great

care in its preparation, and by treating the prepared cotton with weak solutions of alkali, (or by Lenk's process with water glass), to counteract the evil of spontaneous combustion attributed to imperfect removal of the acid. On 31st July 1862, however, the store of gun cotton manufactured on Lenk's process in the Hirtenberg factory (Austria), and assumed to be exempt from spontaneous combustion, exploded from no ascertainable cause in the magazines at Simmering; and although there was an attempt at concealment it became plain that unless this tendency could be counteracted the employment of gun cotton for any purpose would always be attended with the greatest danger. The prosecution of further experiments was abandoned, many large stores of the dangerous substance were destroyed, and the fate of gun cotton seemed finally decided; but in the meantime General von Lenk, who had now communicated to other governments his process of manufacture, the secret of which he had hitherto preserved to Austria, and the celebrated Professor F. A. Abel had not abandoned the hope, in spite of all opinions to the contrary, of yet utilizing gun cotton. Abel has the principal merit—from his method, patented in 1867, of manufacturing gun cotton in a thickened or grained form, and from his rules for a method of storing it up without danger—of having again raised the question of the applicability of gun cotton to military purposes. The material feature of his process is that prepared gun cotton, instead of being used as formerly in the form of lint or yarn or loose bundles, by reduction in a kind of rag engine, precisely in the same way as paper pulp, is converted to a soft pulp, from which slabs, cylinders, leaves, or grains like gunpowder, are formed which can be then properly thickened by compression. In this manner, the violence of the explosion, which was a material hindrance to the application of gun cotton to projectile purposes, is not only considerably diminished, but it is possible in this way, by making mixtures of cotton strongly impregnated with nitre, or by adding other stuffs to good gun cotton, to make products varying in effect, and thus to assimilate to gunpowder this new form of gun cotton, which by change of ingredients can also be so much modified. Another important advantantage of the process of Professor Abel is cheapness, as refuse cotton, clippings, &c., can be used for the manufacture. By this method, and by Abel's discovery that gun cotton kept from the direct influence of daylight can be preserved damp, the question of the utilisation of this explosive material entered on a new stage, the solution of which has been forwarded by the demonstration made by Brown of Woolwich, that the explosive effect of gun cotton can be brought to its maximum by application of the detonating fuse which Alfred Noble first used for his nitro-glycerine preparation.

It is possible therefore, that gun cotton, in its present shape, may become more important than it was in its original form; and the only problem remaining to be solved is that of a process, free from danger, but sufficiently quick, of drying it for use; unless Brown's most recent discovery that damp gun cotton (containing as much as 20 per cent. of moisture) is explosive gives a new direction to the inquiry. Under such favourable auspices, the manufacture of gun cotton has in fact again taken a firm footing, and the Patent Safety Gun Cotton Factory at Stowmarket (the technical manager of which, E. C. Prentice, has also invented a process for producing waterproof gun cotton),* has for some years been producing gun cottons by a process founded on the discoveries of Lenk and Abel, and partly improved by Prentice. This firm, which sends its gun cotton into commerce in the shape of safety cartridges, is said to have been selling, of late, from 30 to 40 tons per month of its compressed gun cotton. The English Government has also recently introduced the use of compressed gun cotton for military purposes, and erected several manufactories for extensive production. Other governments may soon follow their example. In Austria attention has been directed recently to the compressed gun cottons, and extensive experiments have been instituted upon its usefulness, which as the reports show, have resulted very favourably. The occurrence of an explosion of compressed gun cotton such

* For this purpose Prentice saturates the gun cotton in a solution of paraffin in volatile oils.

as has happened in the factory at Stowmarket, though that event indicates the necessity of precaution, should not be a reason to deter fresh experimenting on compressed gun cotton. Gun cotton was very sparingly represented at the Exhibition.

The Henry Rifled-Barrel Company, Blenheim Works, London, exhibited, along with other munition of war, cartridges of compressed gun cotton from the factory of Punshon & Co., London. The great advantage of these consists in the fact (peculiar to compressed gun cotten) that they take fire freely, burn quietly, and only develop their force, which is far greater than that of gunpowder, in a closed space, such as that which they occupy when properly fired from a gun or rifle.

Among other manufacturers of quick matches, the very celebrated firm Bickford, Smith and Company, Tucking Mill, Cornwall, exhibited specimens of their various safety fuses. Among these are especially to be noticed the gutta percha fuses which continue burning 15 feet under water; all other kinds of quick matches are ordinarily extinguished at a depth of five to six feet.

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DRUGS.

By K. D. RITTER VON SCHROFF, *k. k. Hofrath and Professor of Medicine.*

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England and her colonies were only feebly represented, in comparison with former exhibitions. How small was the interest that England took in her colonial exhibition of drugs was manifest from the absence of a printed catalogue of it.

If we begin at once with the paradise of England, East India, we have to regret here especially that the objects belonging to it were arranged for inspection in a manner that very much impeded any close study of them. The arrangement of one object on the top of another, the system of the exhibition, the bottling in comparatively small glasses, with hermetically sealed stoppers, which made it impossible to open them, were all very defective arrangements. A considerable number of the exhibits were put up to such a height (which might easily have been avoided), that the labels and the substances contained in the glasses could only be discerned by the help of an opera glass. In order to bring the exhibited objects into any sort of order it is necessary to arrange them in groups. Those must be regarded as most important which come under the denomination of Materia Medica; while there were some other drugs, in glasses rather larger, with labels containing, besides the Latin and English names, the descriptions in 7, 10, or 13 Asiatic languages, prominent amongst which we rank the East Indian species of quinine, exhibited by MacIvor and Markham, and the Indian articles of food, arranged in a separate case by themselves. Very little satisfaction is derived from the collection of the Horticultural and Agricultural Society, in small glasses also hermetically sealed, brought over by a lecturer. The labels cover nearly all the glass, so that very little can be observed of the contents. Another group under the denomination vegetable condiments includes the familiar amylaceous substances and meals, arrowroot from Bombay and Bengal, tapioca, flour of yam, meal from Cicer arietinum, and the last division contains dry extracts, gums, and resins.

As to the contents of the Materia Medica, we found there many objects familiar to our own pharmacopœia, but also some interesting medicines indigenous to the country. We may mention among the spices and aromatic substances, coriander, sassafras, cumin, dill fruit, fruits of the Daucus carota, Ptychotis ajowan, Capsicum fastigiatum, Capsicum grossum, Illicium anisatum, cardamums from Elettaria cardamomum, Amomum medium, Amomum korarima, Sinapis dichotoma, Sinapis ramosa, roots of large galangal, Pyrethrum, Nardostachys jatamansi, Anatherum muricatum, rosebuds, saffron, camphor.

We distinguish among the narcotics opium in pieces, not in balls, Capita papaveris (very large heads slit up longitudinally, in three kinds, Seyla hesah, Maghahia and Bugobee), roots of Belladonna, leaves and seeds of Hyoscyamus niger, of Datura stramonium and Datura alba, roots of Physalis somnifera from Bombay, seeds and rind of Strychnos nux vomica, Cannabis sativa, Digitalis purpurea, leaves and seeds of Conium maculatum. Three kinds of aconite, namely Aconitum napellus (the root is known by the native names: Mahoor, H. (Hindostan), Bish, Butsnab-Bish, B. (Bengal), Ativassa (Tel.), Bikh, Bish, Bishnak, Ati-singeea-bish, N. (Nepaul), Butchnab (Bombay)), Aconitum ferox in two glasses, in one of which are smaller specimens with remains of the stalks resembling our Napellus, in the other somewhat larger bulbs resembling our specimens of Aconitum ferox (the Indian names are throughout identical with those of Aconitum napellus); then Aconitum heterophyllum (Atees, Atis).

We may mention among the drastic medicines, aloes of three kinds (Barbadoes, Socotra, and Aden); gamboge from Garcinia morella in small baskets and from Garcinia pictorum (Mysore gamboge), in small fragments, Ricinus and Croton seed, colocynth, senna leaves from Cassia lanceolata, Cassia acutifolia, Cassia obovata, or Alexandrian senna, but no Tinnevelly senna. Anthelmintics, Kamala and Punica granatum. Astringents: Galls of Quercus infectorius, of Tamarix furas, Terminalia chebula, roots, bark, and extracts of Berberis lycium, Berberis aristata, and Berberis asiatica; fruits of Randia dumetorum, betel nuts, kino from Pterocarpus marsupium (in rather large pieces), of Butea frondosa, Gambier, catechu of a light brownish red colour, Ægle marmelos, rind of Holarrhena antidysenterica, Hæmatoxylon campechianum. Besides these there were tamarinds, cassia in the cane, liquorice, Fœnum græcum, Flores Rhæados, Colombo root, galbanum from Opoidea galbanifera or Ferula galbaniflua, large specimens of myrrha. Besides these there were seeds of: Gynocardia odorata (chaul-moogra), Guilandina Bonducella, Garcinia purpurea (and its essential oil), Arachis hypogæa, Raphanus sativus, fruits of Nymphæa pubescens, Tribulus lanuginosus, fruits of Diospyros embryopteris, Pharbitis nil, Plantago ispaghula. Buds of: Æschynomene paludosa. Leaves: Helicteres isora, Tylophora asthmatica. Whole plants: Hydrocotyle Asiatica, Ophelia chirayta. Roots: Tinospora cordifolia, Hemidesmus indicus, Trapa bispinosa (this root resembles Hermodactyles in appearance), Cissampelos Pareira, Coptis teeta (folded in a singular web), Salvia hæmaetodes, red Behen (thick, brownish red roots outside), Murdannia scapiflora, Hairs of Mucuna pruriens, sections of the stem of Nelumbium speciosum. Barks: Alstonia scholaris, Azadirachta indica (also the fresh leaves in use). Quinine bark: Calisaya, the common bark of commerce, grey bark from Cinchona condaminea, from Cinchona crispa, Cinchona chahuarguera, together in one glass (these are evidently imported barks), Cinchona succirubra (original, in two glasses), Cinchona succirubra, without a label, common bark of commerce, Cinchona succirubra from Darjeeling, a rather large and thick bark, Cinchona succirubra (mossed), Cinchona succirubra grown in Kangrah (province of Kuhistan in the Siek country). The cultivation was commenced in 1864 by Major Nassau Lees. The specimens are very thin, curled, reddish dull brown colour, or blackish brown with very smooth surface, finely wrinkled longitudinally, under the periderm reddish brown in colour, yellowish brown on the inner surface.

Further there were East Indian quinine barks from the Neilgherries (from the Government Cinchona plantations), exhibited by MacIvor, in small bundles. Grey barks, No. 7 of Cinchona micrantha, from ten year old trees (blackish grey, very often ash-coloured or whitish from young lichen, partly in fine longitudinal wrinkles and without transverse streaks or cracks, partly more or less closely streaked laterally, light fawn-colour underneath the periderm, light cinnamon colour on the inner surface speckled with dust). Brown barks, No. 6 of Cinchona officinalis, from nine years old trees (comparatively thick large barks, with numerous transverse wrinkles and cracks, less frequently wrinkled and cracked longitudinally also, so that four-cornered shaped scales of bark are defined, dark grey brown on the outside, chestnut reddish brown under the periderm, and the inner surface rather bright yellowish brown longitudinal fibre). Brown barks No. 5, of Cinchona crispilla, from nine years old trees

(thick barks with a very irregular outer surface coarsely wrinkled, dark ash grey colour outside with lichen, under the periderm the reddish brown colour of the sweet chestnut, the inner surface of a cinnamon brown). Red barks of Cinchona succirubra No. 1, from ten years old trees, (outside of a light ashen grey or grey brown, here and there blackish or greenish spots with lichen and black apothecia, transverse cracks rather numerous, under the periderm red brown, inner surface reddish brown, the bark of the twigs rather thick). No. 2, mossed, from ten years old trees, blackish brown externally with yellow cork knots and longitudinal channels, inner surface light reddish brown, thicker than No. 1.

No. 3. From young trees of 20 months' growth, yellowish brown externally, with a great number of longitudinal wrinkles, the inner surface of a cinnamon brown.

In a small case near these barks are the chemical preparations of quinine made from these East Indian barks in the manufactory of Ootacamund. Sulphate of quinine from Cinchona officinalis, from Cinchona succirubra, amorphous quinine of brown yellow colour, chloride of quinine from Cinchona micarantha, Cinchonidine, in bright scales like mother-of-pearl, chinoidine, chinovine, quinovic acid, quinine red, quinova sugar, derived from chinovine. Besides these Markham has exhibited barks of Cinchona calisaya and Cinchona succirubra (mossed and unmossed), also from the Neilgherries.

Narcotics. Exhibited in a separate case. Tobacco, in very varied preparations, including large soft cakes of tobacco for chewing, very soft brown masses with cloves, Yurda or tobacco for eating. Cannabis indica: Gunja of different sorts, in small bundles, and with small stalks and the extremities of the buds, a larger specimen very rich in blossom ends and smaller parts of the Cannabis, in three glasses. Bhang: the pulverised leaves, stalks, and seeds. Churrus, of two kinds, in three glasses. One from the Punjaub, of a square shape, but also in the form of a roll, forms a homogeneous mass, very dark brown, extracting moisture from the air, easily cut with the knife, and on the surface of the incision of a light chocolate brown, has a remarkable aromatic narcotic odour, is partially soluble in alcohol, which it colours brown. The second sort, charras, from Bengal, presents irregular pieces, externally light yellow, on the surface of the fracture inside brown, and strewn with pulverised fragments of hemp. Majun, a mixture of hemp and opium, intended for eating, exhibited in various preparations and bearing a variety of indigenous names. One kind of Majun presents greenish yellow square fragments, looking like a larger sort of lozenges. Among these are arranged Mommiai, Moddut, a preparation of opium, Kamoonie.

Of opium there were: Opium from Benares (opium mould, Benares), balls of opium (provision opium), still quite soft to the touch, enclosed in two hemispheres of baked clay. Lewah opium, of 53 per cent. strength, used as a paste between the poppy leaves for preparing the envelope of the opium pills, leaves of the poppy flower gummed together into large pieces lay there also, and poppy refuse coarse and fine. Abkaree opium, Benares, appears in square die-shaped pieces, of a dark blackish brown colour wrapped up in paper. This kind of opium is used for medicinal purposes; the opium pills are only used for smoking. In glass bottles there were: Opium from Berar, hard pieces with a polished surface. Two kinds of opium from Central India (Indore), one of which was a brown black shining piece. In addition to the above 45 different sorts of tea were exhibited, from the Neilgherries, Darjeeling; varieties of seeds candied in sugar very much liked by the Hindoos; sesame, almonds, poppy seeds, &c. The surgeon Bidie exhibited a small collection of drugs, amongst which we noticed Sinapis juncea, Polanisia icosandra, Anethum sowa, Cassia absus, fruits of the Hydrocarpus inebrians and Cubebs.

The last group includes the numerous gums, resins, balsams, substances for dyeing and tanning purposes and fats. Of these there was an extensive collection from which we will only select a few: Bulee gum from Sterculia urens, Kuteerafran Cochlospermum gossypium, gum of the Acacia speciosa, Acacia arabica (Kushlia gum), Ficus religiosa, Ficus elastica, Trachylobium mozambicense (gum animi), Vateria indica (producing a sea green varnish). Resin of Shorea robusta, Hopea odorata (yielding large transparent masses of resin of

the yellow colour of light wine), Ailanthus malabarica, dammar, black dammar from Canarium strictum. Fine samples of gum Benjamin, apparently Siamese, Assafœtida, resin of the Balsamodendron Roxburghii (Bdellium), gum olibanum, resin of Boswellia thurifera, Boswellia Bhau-dagiana, Myrrha, Mastic, Gurjun balsam. Kino from Pterocarpus marsupium in several varieties, and from Butea frondosa square pieces of gambier, roots of Morinda citrifolia, buds of Butea frondosa. That the castor nuts, seeds of Croton tiglium, Gynocardia (Chaulmoogra) odorata, Carthamus tinctorius, Sesamum indicum, Sinapis glauca, Sinapis dichotoma, Guizotia oleifera, poppy, and flax, were not wanting, is a matter of course.

The drugs prepared from animal substances were arranged against the opposite wall. We notice among them; East Indian isinglass in pipe shape from Polynemus indicus, the musk pouch with the skin of the abdomen. (The hairy skin of an abdomen belonged evidently to a musk rat; but scarcely the large round bag which is made fast to the lower end of it with a piece of strong twine. This is not adapted to the construction of the musk pouch; for the rest it smells strongly of musk.) Some undetermined varieties of Mylabris (they are Mylabris pustulata and Mylabris punctata). An undetermined variety of Lytta (judging from its black colour and red head it appears to be Lytta gigas; and the circumstance that another specimen on the side table has three longitudinal stripes shows that there are at least two species in the collection); East Indian leeches of several species (on some of the specimens there are neither stripes nor spots on the back, others have three narrow stripes). Cochineal from the Punjaub, cod liver oil from Hai, and gum-lac.

Ceylon brought its boasted beautiful cinnamon in long pipes bound together in large round bundles, also a cinchona bark exhibited by Layard, of undetermined origin, showing young bark from the small branches of brown and grey colours, with prominent longitudinal wrinkles, numerous circular or longitudinal knots, partly worn down. Many of the pieces are slightly cracked here and there transversely, colour underneath the periderm red brown or yellow brown, inside yellow brown or grey brown. Further, there were arrowroot, tapioca, cassava, tea, many kinds of coffee, vanilla. From the long catalogue of timbers let us name Cæsalpinia sappan, Diospyrus ebenus, Artocarpus pubescens, Caryota urens, Tectona grandis, Vitex altissima, Areca catechu. Amongst the lichens Roccella tinctoria.

Queensland, Victoria, and Auckland represented the wealth of Australia feebly. The first-named country exhibited some very small samples of unpeeled cinnamon from Laurus cinnamomum; Tinnevelly senna from the Botanical Gardens at Brisbane; Queensland nuts from the Macadamia tenuifolia, enormously large fruits of the Araucaria Bidwilli, tapioca, cassava from the Manihot janipha, meal of the Manihot utilissima and of Musa paradisiaca, Convolvulus batatas and Colocasia esculenta.

Victoria brought opium from Gippsland in flat cakes folded up in dry leaves. Bosisto exhibited Eucalyptus globulus and substances prepared from it, as Oleum Eucalypti globuli, Eucalyptus fissilis, Eucalyptus Stuartianæ, Eucalyptus amygdalinæ, Eucalyptus fabrorum; also Eucalyptus oil, essence, tincture, powder and gum from several species of Eucalyptus. Besides these there were Oleum Menthæ piperitæ, Menthæ viridis, Melaleucæ genistifoliæ, Essentia Atherospermatis, Botany Bay resin from the Xanthorrhœa hastilis, and arrowroot from Gippsland.

Auckland was strong in beautiful, pure, transparent kauri gum and a fungus (Hirneola polytricha, Hirneola auricula Judæ) the last is exported in large quantities to China as an article of food.

Mauritius sends the fruits of Myristica moschata and cloves. From the 62 sorts of timber we may notice:—Camphora officinalis, Nephelium Litchi, Acacia Lebbek, Cinnamomum cassia, Hymenœa verrucosa, Artocarpus integrifolia.

The Cape of Good Hope.—Two species of aloes were exhibited, both in little square wooden boxes; one was a large square piece transparent at the sides and yielding a canary coloured powder; the other was of a light greyish liver colour opaque and brittle. Buchu leaves, and leaves of Barosma crenulata, the for-

mer show a mixture of leaves of various Barosma. Further there were white and brown gums and wild Saffron flowers without mention of the plant from which they were taken; this is however Liperia crocea, *Eckl.*, and we have it in our own collection. It is used in place of saffron at the Cape. (Its appearance agrees with the description of the Macedonian saffron. It is easily compounded with real saffron, from its property of staining water instantaneously with its own yellow reddish colouring substance, and from the shape of its flowers.) Very large slabs of vegetable wax, probably from Myrica cerifera. West Africa sent beeswax, capsicums, ginger, palm nuts, Guinea seed (this must be grana paradisi) and palm oil. Natal.—Two kinds of arrowroot.

The Bahama Islands exhibited cascarilla barks, canella alba, and sponges.

Turning our attention now to the mother country England, we have much to deplore in that several of the more important firms such as Howard, Morson (producer of the crystallised aconite); MacFarlane (celebrated for the production of the apomorphin discovered by Matthiessen and Wright) have either exhibited nothing of all, or, like Morson, nothing of any importance. On the other hand, the firm of Smith and Co. (Edinburgh and London) already well remembered for their collection at the Paris Exhibition, is represented in a manner worthy of its reputation by exhibits of rare, and in part newly discovered, chemical and pharmaceutical preparations. We wish to call particular attention to the under-mentioned opium alkaloids and their salts (a speciality of this firm); morphine and morphine salts, supersalts of thebaine, codeine, narceine, extracted from water and alcohol, the last in beautiful silky, brilliant crystals, narcotine, pure crystallised Cryptopia, discovered by Smith in 1864, meconine, thebolactic acid, also an original discovery by Smith, colourless transparent (but already showing signs of colouration), coniine, caffeeine in a large cake, aloine (discovered by Smith 1850) an aromatic essential oil (new) procured by distillation of the solution of 200 kilos. of aloes, cantharidine, resina scammonii in pieces, jalapine, a fatty substance procured from capsicums soluble in water and alcohol, mannite from Taraxacum, furfurine and nitrate of furfurine. Bell and Co. exhibited fluid extracts: Belæ chinæ, sarsaparilla, malti; succus conii, hysocyami, scoparii, taraxaci; thicker extracts of belladonna, conium, cannabis indica, lactuca, hyoscyamus, taraxacum, aloine, and sulphur-coloured podophylline (by Morson); besides a comprehensive collection of the effervescing powders so much liked in England (citras bismuthi, ferri, quiniæ ferri et quiniæ, lithiæ, sodæ citro-tartras, sal friedrichshalli, sal püllna, Carlsbad salts, Vichy salts, ferri-iodidum, subphosphate of lime), effervescing lozenges, (simple: some with lavender, also jalapine lozenges containing two grains of jalapine in each lozenge), cod liver oil, oleum anacardii occidentalis, refined gelatine, spiritus ammoniæ aromaticus.

Mackay, Edinburgh, brought a great quantity of essences and essential oils, and Bush of London an assortment of granulated effervescing powders; granular effervescing lemonade, citrates of magnesia, potash and lithii; granular effervescing tasteless seidlitz powders, seltzer powder, Vichy and Carlsbad salts, effervescing gingerbeer.

Calvert, the celebrated manufacturer of carbolic acid, showed pure crystallised carbolic acid, in a very large cake, fluid carbolic acid, various pharmaceutical preparations of carbolic acid; tooth powder and toilet soaps containing 10 per cent. of carbolic acid, carbolic dog soap, carbolised sheepwashing fluid, carbolic acid disinfecting powder, carbolised oakum, picric acid and picric acid salts.

The British Seaweed Company exhibited algæ from the Hebrides, amongst them some uncommonly large specimens of Laminaria, and the numerous chemical substances extracted from fuci; charcoal for filters, cycle charcoal for deodorising house sewage, iodine, iodide of potassium, bromide of potassium, chlorate of potassium, sulphate of ammonium, oxalate of lime, carbonate of lime, and, from this, bicarbonate of lime. Other firms exhibited various sorts of known resins, anima, kauri, copal, mastic, sandarac, gum Manilla; others again fish oils and various kinds of starch and arrowroot of familiar origin.

Finally, we must mention the drugs of English commerce which were in a special house in the neighbourhood of the Trieste commerce. They were exhibited in closed glasses of modest dimension, therefore only in small

samples. Now, these same drugs, as we are able to say after looking them attentively through, are for the most part represented in the Trieste commerce, and that in a very superior manner; and the few that are not there have either been already mentioned or will presently be so, in their proper place.

N.B—This pamphlet contains, at the conclusion of it, interesting remarks on—1. *Quinines* of the world; 2. Opium cultivation especially in Europe; 3. Eucalyptus globulus (the drug of Australia); but general, not especial to Great Britain and her colonies, therefore not translated.

ADIPOSE PRODUCTS BY DR. HEINRICH SCHWARZ.

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Here we must notice the only oil press in the Exhibition, which was sent by Peter Sibree, of Driffield, in England. It is what is called a plattin press; and has four presser moulds which turn out tongue-shaped cakes. It is very strongly constructed of cast and wrought-iron, and has a hydraulic piston of 12 inches diameter, which can be easily removed for repairs without dismounting the whole press. The press is proved up to 300 tons pressure; but it is only worked up to about 130 tons, which distributed over the surface of cake, which is 113 square inches, gives more than a ton (precisely 23·6 centners), or 154 atmospheres, to the square inch. The pressers which hold the seed are made of strong sheet iron fluted inside, surrounded with a felt rim which encloses the sides, and fitted with handles at the broad ends, and on the narrow ends opposite fastened with strips of leather in the form of hinges. This gets rid of the wrapper, which is so easily torn, facilitates the filling of the press with seed, and the removal of the prepared cakes, whilst the oil flows out conveniently. The cakes are turned out very firm and sharp at the corners. The working pump that is also exhibited is capable of supplying six presses at once. It contains one piston of two inches diameter, and one of an inch. Both work together at first while the press shuts rapidly, but as soon as the valve of the large piston opens, all the power is transferred to the small piston until its valve also has risen so high as to indicate the attainment of the pressure required. The work was cleanly and very thoroughly done.

J. C. and J. Field of Lambeth, London. Earth-wax or Ozokerit has recently sprung up, as an important rival of beeswax,—and is of so much the more interest to us because it is produced almost exclusively in Austria. The earth-wax is found in Galicia on the northern slopes of the Carpathians at Drohobycz and Boryslaw, and is obtained partly on the surface and partly by subterranean mining. Its occurrence is certainly connected on one hand with that of petroleum, on the other hand with salt. In the Galician department it was exhibited in its rough state, containing fibry gypseous earth, and clear transparent salt crystals, and also in the condition it assumes when having been melted and freed from earthy ingredients it is poured into slender conical moulds. In this condition the darker colour, which is easily clarified by the expulsion of the air, the firm cohesion of the wax on its congelation, which is shown from the indentation of the top surface, and, finally, the peculiarity of the fracture, give it a remarkable similarity to raw beeswax. Candles were made in Galicia a long time ago out of this dark brown if not black material, which burned with a good light in spite of their uncouth colour. When, however, the production began to take larger dimensions the wax was at first used as a raw material for the production of paraffin. When it is decomposed by distillation an extract is obtained which yields, besides photogen and solar oil, abundance of paraffin not easily fusible. Whilst the raw earth-wax liquifies at a temperature of about 60° centigrade, the distilled extract has the consistency of butter at an ordinary temperature, and is completely fluid at about 35° centigrade. The attempt to improve the colour is therefore made at the expense of the valuable property of a high temperature at liquefaction point. It is therefore an immense advance made recently that the earth wax is bleached immediately. A substance is thus obtained which it is hard to distinguish from the best white wax, and apparently with a small loss of quantity. . . . J. C. and J. Field exhibited bleached Ozokerit and

candles made of it, which according to the report of Professor Letheby, give very favourable illuminating results, 75·4 parts in weight yielding the same amount of light as 100 of spermaceti. The melting point reported at 59° centigrade comes very nearly up to that of wax, and admits therefore of the use of the Ozokerit candles in tropical countries where the common paraffin candles would bend. The only object in this case apparently is the bleached wax; the method of bleaching is at present preserved as a secret.

In most of the states where manufacturing industry is at all advanced there exist Stearine factories, which were represented almost without exception in the different sections of the Exhibition. I mention among them Price's Patent Candle Works, Battersea, London, (others from all countries), and finally the numerous Austrian manufactories. Among all these exhibitors those of Austria are distinguished not only by the extent of their exhibits, which would naturally result from the facility of exhibition, but also by the equality of excellence of their productions. The exhibits being so widely dispersed it is scarcely possible for the reporter to form a judgment whether one exhibitor or another shows the best; that is to say, the whiter or harder goods. In any case this exhibition furnishes a new proof that Austria is taking up a leading position in this manufacture, and this not only by the excellence of its raw material, very hard tallow from Austria, Hungary, the Danube provinces and South Russia, but also from the intelligence and enterprise with which the manufacture is conducted.

A novelty in the moulding of candles is the introduction of four longitudinal perforations by which the overflow, outside, of the melted Stearine is to be prevented. In our opinion a better means would be the choice of a proper proportion between the thickness of the candle and that of the wick. For the same purpose J. C. and J. Field recommend their Lychnophylax, a curious little glass frill to be placed on the top of the candle which sinks down upon it as the candle burns away.

The lubricating oils and greases for smaller and heavier parts of machines form the last branch of this section. Whereas formerly fatty substances were principally applied as lubricating material, the resinous oils and calcareous lubricators of resinous oils (the so called Belgian Patent waggon grease), the paraffin-rich solar oils, and especially some raw, very heavy petroleum kinds (Vulcan and Globe oil), soapy combinations of fats with carbonic alkalis, and solutions of dry soaps in coal tar, either alone or in a variety of combinations, have attracted a great deal of attention. The more such a lubricating material diminishes the loss of power by friction, the longer it preserves this property, the slower it is to congeal, and the less it adheres to the parts of the machinery in motion, so much the better it is. A certain degree of viscosity is particularly required for heavily laden axles, without which the lubricating grease between the parts in motion gets squeezed out. Even for light axles in very rapid motion some degree of viscosity is desirable, or else the lubricating grease is too quickly thrown off by the centrifugal force. Olive oil, which was formerly universally used now generally finds a substitute in rape oil, either applied raw, after having been allowed a long time to settle, or refined with a very small quantity of sulphuric acid and rinsed out as thoroughly as possible. The oleic acid liberated in the process of refining can, it is true, not be got rid of in this manner. It is possible this might be done by solution in alcohol, which liberates free oleic acid, but not at all or only to a very small degree the neutral oil. Attempts are made to give this neutral oil the necessary viscosity or cohesiveness, which it loses in refining, by adding to it castor oil, resin, resinous oil, or india rubber dissolved in oil. Such machinery oils as these are exhibited by a large number of oil manufacturers. The property of becoming resinous in the air, especially in contact with metals and on heating, is especially characteristic of vegetable oils. Highly refined olive oil and oxen hoof grease are tolerably free from this property. They make therefore an excellent lubricating material for clocks and sewing machines. England and America have excellent lubricating greases in their spermaceti and lard oils.

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WINE.

Extracts from Report by FRANZ LEIBENFROST, *wholesale dealer at Vienna.*

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Never has there been so great a number of exhibitors and exhibited wines. By the side of America stood Africa with wines from Egypt and the Cape; by the side of Europe, represented by France, Greece, Italy, Austria, Portugal and Spain, even Russia and Switzerland, stood Asia with Turkish and Persian wines.

England, or rather the English colonies, Australia (especially Victoria), and the Cape of Good Hope, exhibited very excellent wines which fully justified their reputation. For trade, principally to England, these wines constantly gain importance.

The Cape produces at present 230,000 eimers; Australia, of its strong wines, rather more than 250,000 eimers, or 3,190,000 imperial gallons.

In Australia, in the province of Victoria, the German and French grapes have been introduced for about 15 years with the greatest success: and the results, especially in the case of the white wines of Victoria, are, to judge by the samples submitted to the jury, quite astonishing.

An indisputable advance upon previous years is here to be noted; and the rapid progress and rational pursuit of the cultivation of the grape may have a serious influence on the value of land.

As to the Cape wines, which are nothing new, it can only be said that they maintained at Vienna their old fame and their importance in commerce.

Cellarage, Fittings, and Utensils. Some well-finished and rasped brass taps in the English department pleased us. The pipes exhibited from other countries with fittings of tin and cork were in no respect novel, and generally were intended for small consumers. There was a considerable number of various smaller cellarage fittings, including very practical cork screws, bottle baskets, and bottle racks of iron, the last easily portable. In the French and English galleries we found *isinglass* of all sorts, ordinary, fine and finest; the best of all were in the Russian department. The best gélatine was exhibited in the French department. Of machines for fitting capsules on to bottles one exhibited in the English department, the efficacy of which has been established by use, may perhaps be termed a new invention, but it is already known to the technical enquirer.

PRESERVES, EXTRACTS, AND MEATS.

Report of CARL WARHANEK, *Merchant, Vienna, Member of the International Jury.*

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We learn from the London Trade Report of Mr. D. Tallerman, importer of that city, that in the year 1872, 321,991 cases of meat, representing a value of 890,700*l.* sterling, were imported into London from the colonies of Victoria, New South Wales, New Zealand, Queensland, and South Australia. The report expresses regret that the excellent qualities of the Australian kinds of meat, viz., beef, mutton, veal, smoked tongues, mutton hams, and so forth, have not yet been properly appreciated in London; and yet the meat, free from all bone, in spite of its expensive envelope of metal and the freight, costs from 1½ to 2 francs less per tin of 6 lbs. weight than fresh meat.

England uses its mustard in the form of a powder, which is prepared fresh every day for use at the table by mixture with wine or vinegar.

The firm Crosse and Blackwell, of London, has earned considerable celebrity, and exhibits a collection of vegetables that for external appearance and quality leave no improvement to be desired. Beautifully decorated flacons show off to the greatest advantage the different kinds of vegetables, which appear to have been almost anxiously selected and arranged so as to exhibit none but the most beautiful objects that nature produces. It must be ascribed as a peculiar merit to this manufacture, that although the vinegar generally disturbs the colours of the vegetables, the latter remain whole and sound, and are so well bleached that the vegetables themselves are neither too soft nor too hard, and can be preserved undissolved for years.

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Preserves.

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England.

The manufacture of preserves in England has been very much cultivated for a number of years, because England's position as a maritime state required a sufficient supply of provision for her ships to be always ready in store. In the Exhibition were to be seen collections of all preserves of luxury, as well as of those which are indispensable for daily consumption, beginning with small things, such as chopped meat with sago, preserved potatoes coarsely ground, soups and meal of peas in parcels, and so on up to the most expensive preserves of poultry and game. The whole displayed an excellent selection of articles of food, and passenger vessels sailing in all directions are provisioned with these goods. Not less important is the consumption of the Royal Navy. The most interesting exhibition was that of Crosse and Blackwell, of London, for the abundance of its contents, the great variety of the preserves, and the beauty of their arrangement. The fruits preserved in vinegar and sugar, especially, were magnificently and luxuriously arranged. A new and extremely interesting bottle stopper was exhibited here, which, without the use of a bladder, parchment, or cork, prevents all access of air, and is nevertheless easy to open, and capable of again being immediately and hermetically closed.

Of equal eminence with the above firm is that of Batty and Co., of London. Worthy of notice, also, is the Preserved Milk exhibited by the English Milk Company; amongst which we had milk by itself, or in combination with chocolate, cocoa, or coffee; it tasted well, and looked beautiful.

The English Colonies.

There is no country which has made such good use of Appert's method of preserving as Australia. The enormous production of domestic animals as compared with their small consumption within the country, created such a superfluity of meat that much of it was not consumed at all, but boiled down for its tallow, the residue, after that operation, being buried in the earth. It is evident that a great source of wealth for the country was thus wasted. But since the introduction of the manufacture of meat extracts, and the preservation of meat in metal tins, vast quantities have been thus utilised with great profit to the manufacturer. In the English colonies there are 53 manufactories of preserved meat which are carrying on this branch of industry with success. Some of them sent specimens of their well-known produce to the Exhibition.

SUGAR BAKING, CANDIES, AND CHOCOLATES.

Report of A. Gerstner, *Juror.*

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The more remarkable productions were met with in the following order, adopting that of the general catalogue: The chocolates of Fry and Sons, London and Bristol, were of very good quality, amongst which one chocolate, com-

bined with condensed milk and preserved in porcelain boxes, deserves mention if only for its novelty. Keiller and Sons, Dundee, had very good candies, sugar plums, and orange marmalades, which also appeared worthy of notice.

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TOBACCO.—By Franz Riedl.

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England had only one exhibit of very finely rolled Havanna cigars of various sorts, sent by a London importer. We must, however call attention to the tobaccos and cigars exhibited by Queensland, the Cape of Good Hope, and India, which were really well worthy of notice, the East Indian tobaccos particularly deserving attention, because, though their cultivation is at present in a very low condition, these tobaccos have recently begun to be imported into Europe in considerable quantity.

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SUGAR.

Apparatus and Machinery for Sugar Manufactories, by Dr. Joseph Hanaman.

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England exhibited for the most part none but colonial sugars. That sent by J. B. Brancker of Liverpool, and the Brazilian sugar of S. P. Johnstone, were very fine. It seems probable, judging from certain appearances, that the production of beetroot sugar will soon be carried on in England to a greater extent than heretofore. The quantity of sugar manufactured in England is now steadily on the increase. It amounted in the year 1869 to 29,234 cwts.; still very little, it is true, when considered in comparison with the enormous quantities which are annually imported into England.

Samples of various kinds of sugar from the English colonies in the East Indies were exhibited by Carew & Co.; a small sugar loaf of about 10 pounds in weight, of a middling grain, and the whiteness of our powdered loaf, but the only sugar loaf exhibited from all the refineries of the East Indies. There was a great quantity of samples of centrifugal crystallised sugar and colourless and dark samples.

Beckanner exhibited white sugar candies, and John of Bengal yellow compact lump sugar, light yellow powdered sugar, fine-grained and of very good quality. From Punjas we found yellow and brown moist cane sugar; from Madras some crystal sugar acknowledged to be fine; while some dirty yellow sugar candy was shown by Bandy of Baroda.

From the English colonies in the Mauritius the establishment of Saint Aubin-Savane exhibited some remarkable sugars very coarsely crystallised, and some fine colonial sugars, produced by Dr. Icery's process without the application of animal charcoal by a system which is preserved as a secret, and passed through the centrifugal afterwards.

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FLOUR AND OTHER FARINACEOUS PRODUCTS AND APPARATUS FOR CORN MILLS AND BAKING.

Report of Friedrich Kick, *k. k., Regierungsrath and Professor at the German Polytechnical Institute at Prague.*

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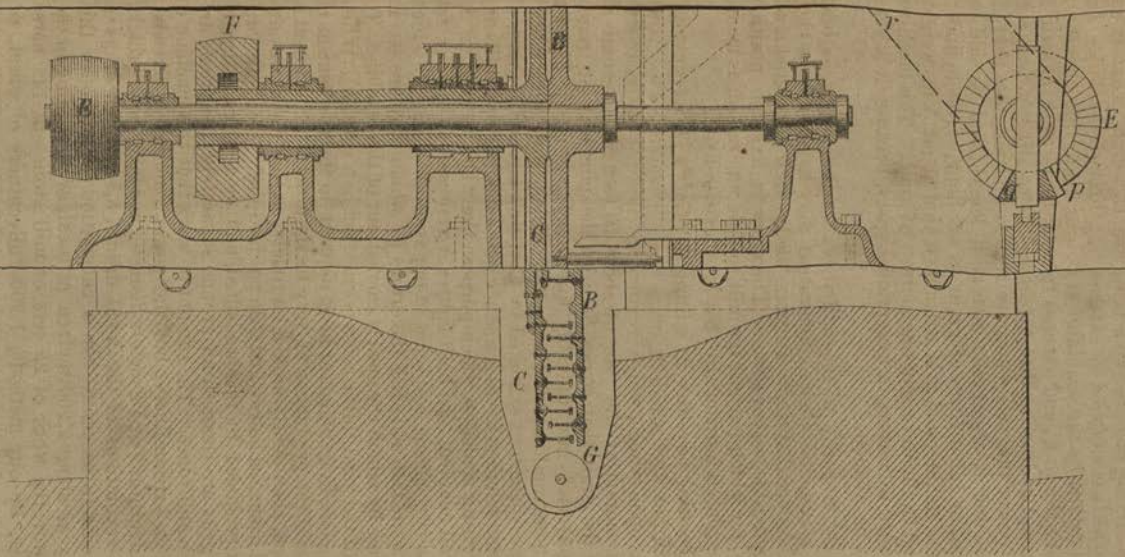
Corn dryers.—Davey, Paxman, & Co., Standard Iron Works, Colchester, exhibited a corn dryer, of which the woodcut (Fig. 4, table 1) is an illustration. (A) is a hollow, rotating cylinder, through which the steam

enters (*a*), escaping at (*b*), and passing through a pipe (which does not appear in the illustration), to the steam jacket (B B), is finally let off with the waste water at (*c*). The cylinder (A) is fitted with four drivers, bent into slightly helicoid form and perforated, holding brushes. The grain to be dried is filled into the funnel-shaped receptacle G the application of rollers brings it in regular quantity into the space C, it is then taken up by the brushes and bands, and gradually forwarded to the outlet D. The holes in the drivers are to cause a turning of the grain. Along this path the walls above and below the grain are always heated with steam, and evaporate the moisture that it contains. For the purpose of carrying off the steam thus generated change of air is supplied to the drying chamber by a ventilator E, which exhausts air from the chamber F, which is supplied by external air through the holes *i i*, and this air, warmed, is driven by the ventilator at G, into the drying chamber, passes along it longitudinally to C, and escapes from it heavy with moisture at *d*. It is to be seen from the drawing that A receives its rotating movement from *f*, but the motive power that sets *f* in movement is omitted, also that of the ventilator. The machine is about four meters in length, and is said to dry 17·5 Vienna metzen, or 1,080 litres of grain, in an hour. The cylinder makes 34 revolutions in a minute, and it is calculated that about 1 lb. weight of good coal is consumed in the drying of one metzen of grain. This machine will only be recommended to millers in exceptional cases, because it is very seldom that corn has to be washed.

Millstones.—The great majority of the millstones exhibited were stones with moveable upper stone, and their enumeration may be omitted as they presented no remarkable peculiarities. Turners of Ipswich exhibited a set of mill stones with a moveable nether stone. The stone is fixed in position by lifting the bedstone, for which purpose the mill spindle was raised, as usual. The upper stone can be placed horizontally, but is otherwise fixed.

Among the most interesting novelties in milling is "Carr's *Disintegrator*" or sling mill, which performs the grinding on a new principle. Two rows of steel pins arranged upon wheels which revolve in opposite directions to each other, are set in motion at the rate of about 70 feet in a second of time, and throw about the grain that comes between the pins with so much violence that it is converted into tolerably fine, mealy, groats. Figures 1 and 2 shew two constructions of Carr's mill which was represented in the Exhibition by two specimens exhibited by Carl Selbach and Deiters, of Mannheim, in the German pavilion for tiles and ice machines. These mills are however used for pulverising coals, for which purpose the "Disintegrator" is said to be peculiarly well adapted. In both figures A represents the inlet for the grain; B and C the two wheels revolving in opposite directions in which the steel pins *i i* and *o o* are fastened; E F the drums by which they are set in motion, and G, the screw by which the meal is carried out of the machine. To prevent the scattering of the meal the machine is enclosed in a case (*h*). When the Carr machine is applied to grinding, or as an adjunct to the mechanism of the mill, its object is only the production of very mealy groats. The wheat is in the first place cleaned, then gently broken on rollers, so that the grains are divided each into two flat-shaped halves, and then put into the "Disintegrator." The very mealy groats produced by this are bolted, and meal, grits, and pure groats obtained. The grits are cleaned and ground separately, the groats are also further pulverised in millstones. The amount of work that this machine is capable of performing is extraordinary, but the power required is likewise considerable. A "Disintegrator" of 1·8 meters diameter and 0.23 meters thickness produces, in 400 revolutions of the meal drums, 5,814 litres or 94·5 metzen of wheaten groats in an hour. On a calculation of 24 hours this would render a quantity of about 2,200 metzen of meal, or, according to the statement of the inventor, the work of 25 sets of mill stones of 145 horse power. But seeing that, by our methods, 1,200 zollcentners of wheat, or about 1,300 metzen, are reduced to groats in 16 hours on four sets of millstones with 7-horse power, only five sets, or assuming the pulverisation by the "Disintegrator" to be twice as effectual, 10 sets would be required to do the same work. The inventor might object that the pulverisation effected by the "Disintegrator" is equivalent to that of four rough grindings by the miller, it is still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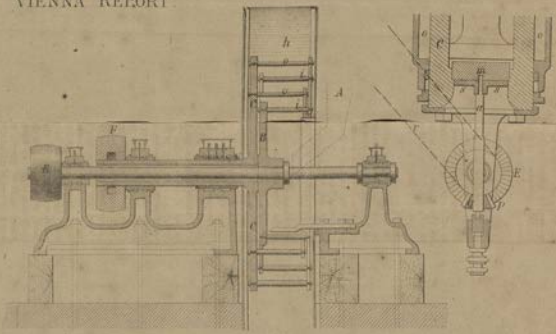
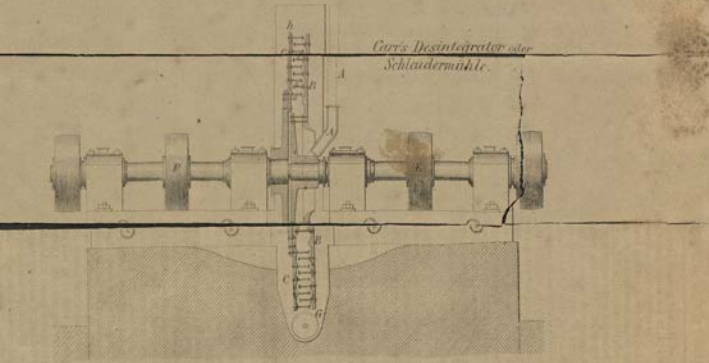
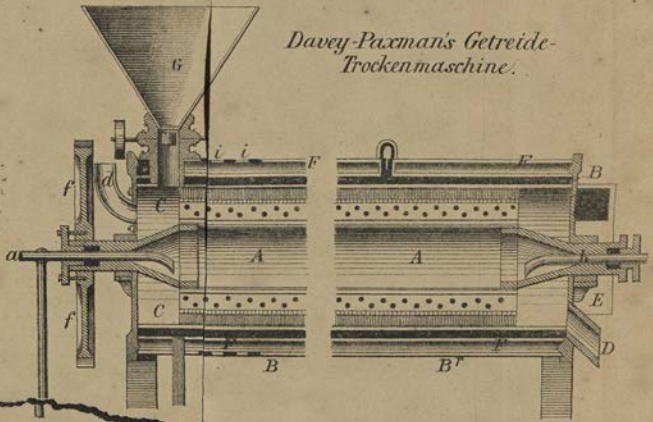




Carr's Desintegrator oder Schlaudermühle.

Davey-Paxman's Getreide-Trockenmaschine.



Vincent Brooks, Day & Son, Lith.

more, and in this circumstance lies the advantage of it. We perceive from his consideration that the question we have to deal with is "What are the properties of the produce turned out by the 'Disintegrator'?" The writer is indebted to the kindness of Herr Docent Zeman for a small collection of flours produced at the corn mills of Gibson and Walker, of Bonnington, near Edinburgh, with Carr's "Disintegrator," and has thus been enabled to analyse these productions, although with the small number of samples of "Disintegrator" groats he has not been able to arrive at the percentage contained of meal, grits, and groats. The groats turned out by the "Disintegrator" contain a great deal of meal and large pieces of the grains but on the other hand not much grits. According to a statement in Dingler's Polytechnical Journal, vol. 204, p. 449, they contain 33 per cent. of meal, 20 per cent. of moisture, 14 per cent. of grits, and 31 per cent. coarse particles (groats). What is the bearing of this result on the requirements of "flat" and "high mill grinding?"

"High mill grinding" consists principally in a plentiful production of what are called fine meals. But these are only to be obtained by the perfection of the grit cleaning and grinding, the high miller must therefore do the most he can with grits, which he can only dispense with if he can obtain fine meal in sufficient quantity by another process. Now, as the "Disintegrator" produces but *little* grits, and the meal it produces is not of the finer sorts, as will be made apparent by the following table of comparison, it follows that the "Disintegrator" is not applicable to purposes of "high mill grinding."

A hundred parts of wheat render:

In the Austrian method.		From the Disintegrator.	
Meal No. 00 or Kaiserauszug	18·9	These sorts are not produced.	
„ 0 or Auszugmehl	13·8		
„ 1 „ Bakers 'Auszug'			
„ 2 „ „ „	12·0	Semolina	26 per cent.
„ 3 „ "Mund Mehl"	13·7	Meal direct from the "Disintegrator"	45 „
„ 4 „ "Semmel meal"	11·9		
„ 5 „ White 'pollmehl'	7·3	bran flour, &c.	11·75 „
„ 6 „ Black „	4·5		
Bran or 'fussmehl'	16·4	„ „	15·75 „
	98·5		98·5

This statement is taken from a pamphlet published by Carr, in August 1872. The items given in the pamphlet "bran flour" 4·5 per cent., "exhaust flour" 1·5 per cent., "seconds" 4 per cent., "parings" 1·75 per cent., are here collected under the heading of "bran flour," &c.

"Flat mill-grinding" is in a different position. Either it produces no finer sorts, or only a small quantity. A well executed grinding on this system rendered:

Pollen (about equal to No. 2 above)	3·92	per cent.
Flat flour (between No. 2 and 3)	40·16	„
Semolina flour (between Nos. 3 and 4)	6·26	„
Firsts (kernmehl) (equal to No. 6)	8·91	„
Bran flour, &c.	13·71	„
	91·96	„

The general result of "flat mill grinding" can be taken as:—

73 per cent. flour Nos. 1, 2, and 3.
7 „ „ „ 4 to 6.
17 „ bran flour.

If we compare these results with the produce of "Carr's Disintegrator" described above, we perceive that the "Disintegrator" is more likely to have an influence in the "flat mill" grinding; but that even in this respect there is some question still as to the advantages to be derived from it. Carr says,

"However much rapidity and economy of labour may be promoted by the dis-" integrator, yet the principal object is the quality of the flour produced, and " this is especially proved in its fitness for baking." The last sentence may be perfectly true, for the flour produced by the "Disintegrator" is more granulous than that from stones, and it is scarcely possible for it to produce flour, so-called, "ground to death." Flour of this kind, which "flat mill" grinding often produces, is objectionable, and the miller avoids it by judicious management of his millstones. This one advantage alone cannot be decisive. It is certainly true that in the produce of the "Disintegrator" the bran flour generally comes in large quantities, and is therefore less broken up, but the advantage of this would only become appreciably useful if the grits and groats after the sifting are passed through a cleaning process, as they are in the "high mill" grinding, the result of which would be a sort of half "high mill" grinding. In this, perhaps, locally, some progress might be made, but in comparison with Austrian grinding or the high mill grinding it would still be only a half measure.

Seeing that the quality of the flour produced by the "Disintegrator" is such as to prevent its use in the "high mill" grinding, and not to recommend it particularly for "flat mill" grinding, we must now turn our attention to the quantity of work it is capable of doing. As we have stated above, one "Disintegrator" renders 5,814 litres in an hour, of which quantity one-third is flour or a finished product (*i.e.* 1,938 litres) whilst the remaining two-thirds require to be ground over again, one set of mill stones on the other hand works 3,690 litres in a day, just 154 litres an hour, the work performed in completely ground produce therefore bears the proportion 1,938 : 154 or nearly 13 to 1. The power applied is as 145 : 8 or nearly 18 to 1. Therefore, whilst the "Disintegrator" does 13 times the work it employs 18 times the power. In this calculation however the work that it does in producing grits and groats is not fully taken into account, because this could only be calculated by estimates and approximately, but the figures given above will nevertheless serve in some measure for assisting the arrival at a result. Carr himself says that his "Disintegrator" of the dimensions mentioned above requires 63 horse power to be set in motion empty. This leaves only 145—63=82 horse power for the work. This enormous waste of power can only be caused by the resistance of the air, and as the machine cannot be worked *in vacuo*, the only remedy for this would be to obviate the whirlwind inside by a proper arrangement of the cross pins or pivots without interfering with the efficiency of the machine, probably a difficult problem!

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CELLAR FURNITURE AND UTENSILS.—H. GOETHE.

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In cellar requisites, the most numerous exhibits were the apparatus for corking, filling, and cleaning bottles. Farrow & Jackson, of London, exhibited corking machines for one to three bottles, bottle-brushing and cleaning machines, contrived to work with a treadle and fly wheel, for two bottles, bottle filling apparatus and every kind of smaller cellar utensil for which this firm is distinguished. Amongst the corking machines must be noticed a very peculiar and novel method of corking and capsuling represented from England by the Patent Cork Company, from France by J. D. Becker, Patent Cork Company, Limited, Paris; the plan of which is that a flat cork is pressed on to the bottle and held so tight by a capsule, with an india-rubber covering, that the liquid cannot escape. As this process is still new, it remains to be ascertained by a thorough trial whether bottles corked in this manner are fit for transport, and whether the wines are adequately protected by this thin slice of cork.

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TEXTILE AND CLOTHING MANUFACTURES. WOOL AND WOOLLEN GOODS.

Report by DR. CARL TH. RICHTER.

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We briefly summarise the results of the Exhibition in the respect of raw wool, referring for statistics of trade and import of foreign wools, Australian, La Plata, and the Cape Colonies, to the report on the commerce of the world, and the chapter in that report upon raw materials from the animal kingdom, where the production of wool and the trade in it is considered; and to the report upon Group II., Section 2, in which Professor Pohl gives a thorough account of this important material for manufacture.

In this place we will only state that the number of the sheep in Europe amounts to somewhat more than 260 millions; of which 43 millions are in Russia; 30 millions in France; 34 millions in England; 29½ millions in Germany, 22 millions in Spain, and 16½ millions in Austria.

The wool-producing flocks of Australia have attained great importance during the last decade. The flocks accessible to civilisation in Victoria, New Zealand, New South Wales, and Queensland, are estimated to contain at least 67 millions of sheep, without including in the estimate the flocks running wild. By the last published statistics it appears that the export of 1872 and 1873 amounted to 554,384 bales, weighing 188 millions of pounds, of the value of 126 million guldens. In the United States of North America the number of the sheep is estimated at 32 millions. From the States of La Plata we have returns only of wool exported, estimated at 200 millions of pounds weight; and the same from the Cape of Good Hope, estimated at 28 millions of pounds weight.

The world's whole produce in wool exceeds 1,250 millions of pounds, of which Europe still produces 570 millions. For beauty and elasticity, for length and regularity of fibre, European wool is still the best; and it is the merit of England, by careful cultivation and provident intermingling of breeds, to have set a good example to the whole of Europe. But wool endures long transport with less detriment than any other raw produce; the transoceanic wools have, therefore, in spite of the great and for many years increasing production of Europe, invaded the markets more and more, and exercised a great pressure on the prices, especially of European wools. Moreover, a peculiar characteristic of the Australian wools is fineness and strength of fibre. We will presently revert to the movement of prices. There is no doubt that the introduction of transoceanic and foreign wools has had a great effect in increasing the European consumption, so that even the lower classes can now afford to use woollen stuffs. The consumption in England, and perhaps in France also, rather exceeds 4 lbs. per head of the population; in Germany it is 3·6 lbs.; in Austria 3 lbs. The movement in European trade in raw wool has imported 684 millions, and exported 271 millions of Austrian (customs) pounds. In 1870 the import was 333 millions, of which the greatest part was supplied by Australia and went to England.

The home produce of English wool was not represented at the Exhibition; but it was replaced by the Australian wools and the wools of Uruguay. These are now the great centres of production; and the wools of the La Plata states, brought into commerce under the name of Buenos-Ayres wool, are imported from England by France, Belgium, Germany, and Austria. The average re-exportation of foreign wools from England exceeded, in 1872, 102 million pounds. The improvements by which the "picking," ("culling," or "unburring") machine has been recently perfected makes it possible to work up these wools in such a style that the yarn spun from them can be used for "nouveauté" of every kind. Those who are not experts even would be interested in the wool samples from South Australia, of pure breeds exhibited

by J. H. Angas, Esq., Collingrove, and in those from a breed of Leicester rams and Merino ewes. The sheep from which these wools were obtained, were represented at the same time by photographs.

Woollen Yarn.—It is well known that England has the largest spinneries for woollen yarn, but fewer for combed, than for the so-called weft yarns, which are spun in the same way as carded yarn, but its material is harsh and bright in colour, taken from the Soutte-sown (Query "Southdown") sheep of England and Scotland. With these weft yarns England keeps her own and foreign markets supplied. The consumption of this description of yarn is altogether colossal, for yarn of this kind forms almost the chief part of the material for ladies dresses, the so-called Orleans stuffs; the "mode" dress stuffs that are manufactured in Germany, in Glauchau and Meerane; and in Austria, in Asch and Aussig. England and France draw their supplies of carded yarn from Verviers, and have thus in egree abandoned the competition with Belgium.

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WOVEN WOOLLEN GOODS.

Report by C. FALK, *Director of the combed yarn spinnery at Voslau, and by* DR. CARL TH. RICHTER.

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England is the first manufacturing state of Europe, and her manufactures of woollen goods are so important, that the mighty island empire is at the apex of this industry also. She has long overcome the difficulties placed in her way by the circumstances of the world-trade. She has cheap money, cheap coals, division of labour, and great merchants and commission agents who have been carefully developing, for many decades, the export to Europe and transoceanic countries. She has on all sides good treaties of commerce, which permanently promote the development of her manufacturing industry by lively trade, and every one of her merchants finds in foreign countries powerful and energetic support from the government. These are the means by which the commercial industry of England has grown powerful in the world, and which have maintained its power so long that all competition is vanquished with ease, and her domination permanently maintained. These are the means by which the manufacturing industry of England, even if it seems paralyzed, or about to become so, in some of its branches, or to be standing still in its progress, yet permanently prevails over that of all other countries. And the English woollen manufacture appears to be now in the last-mentioned predicament. Although the most esteemed firms of the English woollen manufacture were absent from the Exhibition, the objects exhibited gave an adequate illustration, by which a judgment could be formed respecting its present condition—a judgment confirming our views expressed above. The cloths and stuffs for men's clothing displayed no progress at all, either in variety or in design and attractiveness. Solid and genuine workmanship they display, it is true; but compared with the well-known Brünn manufactures, the materials are all deficient in elegance. The goods exhibited were certainly most of them light cheap stuffs. Although England possesses very excellent woollen yarn from Port Phillip wools, which produce smooth naturally brilliant cloths, her stuffs for men's clothing were in design, colour, and finish, far inferior to the productions of Bruenn; and her flannels and similar goods were as much surpassed in respect of material and pattern by the productions of France and Austria.

The finer goods, stuffs for coats and trousers from Birchall & Company, Leeds, had a fine mixture of colours; the "everlastings" and "toskings" of Strachan & Company, were in fine dark colours. The flannels of Bliss and Son were also very beautiful; but the whole devoid of any importance. Among the most successful were the various mixed cloth stuffs and imitations

of fur and astracan, such as were exhibited by Zossenheim and Brothers, which had a beautiful brilliance and deep blackness of colour. The plushes and "egalisirung" cloths were also fine, and were distinguished by great genuineness, beautiful work, and good finish; like the smooth cloth goods in general. In Cheviots, lightly worked and cheap goods, mostly mixtures with artificial wool and other substitutes, which in spite of their want of durability, are much liked, England showed a production, by means of which it is preparing an important competition to the Bruenn manufacture. But the materials for ladies' dresses, such as were exhibited in a rather rich assortment by several firms, presented nothing but old taste, and seem altogether to be intended only for wholesale consumption. Among them all there was not one prominent article to select for notice. The success, therefore, of England, since she makes less account than ever, in the tendency of her taste, of the demand of the world, seems to be attributable to her equally divided, and, therefore, much cheaper and better labour, and naturally, also, to the constant market that exists for her goods. So long, therefore, as these conditions of trade and manufacture are not attained by other states, England, however *little* progress she may make in taste, will maintain the possession of the world market.

A creditable exception must be made in speaking of railway rugs and plaids; such, for example, as were exhibited by B. B. *Hepworth* and Son, New Wakefield Mills, surpassed by no previous Exhibition. Equally worthy of praise is the English carpet manufacture. Genuine and heavy in the extreme as to workmanship, successful in pattern, and perfect in colours, English carpets hold now the highest rank. Axminster and Brussels, Kidderminster and stair carpets, in all colours and styles of art, were sent to the Exhibition in the most successful specimens. Most of the Axminster and Brussels carpets are made on hand looms in the manner of ordinary velvet. Halifax and Glasgow are the principal centres of this manufacture, and John Lewes, of Halifax, James Templeton and Company, of Glasgow (this firm for the most part sending renaissance patterns), and Cook, Sons, and Law, of London (with Axminster carpets in the Persian and Moorish taste), exhibited the most excellent specimens of this kind of manufacture that were to be seen in the Exhibition. *The Kidderminster* carpets are still partly woven on hand looms, but most generally on power looms. They have no pile in the ordinary kinds, but have two sides, both of which can be used, so arranged that the colour of the ground of one side becomes the colour of the pattern on the other, and the colour of the pattern on one side becomes the colour of the ground on the other. The Kidderminster carpets are partly complete drawing room carpets, partly woven in the piece, which then has to be sewn up. The carpets with white figures on red ground, however violent in colour, were nevertheless uncommonly beautiful. Brinton and Company and Morton and Sons, Kidderminster, were very well represented. One speciality sent from England was the felt carpets with printed patterns designed in imitation of woven carpets.

British India sent varieties of woollen goods and articles embroidered with silk to the Exhibition. These are produced like those of Turkey by the house industry, and form parts of the costume of the natives, especially of the women. Although not so brilliant as it was at the Exhibitions of London and Paris, the display of Indian shawls formed the centre of attraction. They will be commented upon in another chapter.

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FLAX AND HEMP MANUFACTURE.

Report by CARL VON OBERLEITHNER, *of the firm Edward Oberleithner's Sons, in Moravian Schönberg.*

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In Great Britain and Ireland complaints are raised of the rise in the price of coals and the difficulties of the labour question. On the continent and especially in Austria, where the spinning establishments are much more expensively constructed, and the mode in which the business is conducted renders it necessary for large stocks of flax and yarn to be kept on hand, the nett profits are reduced by the high interest on capital in an unprecedented manner. The greatest energy is called for on the part of all concerned in the flax trade to invigorate this branch of industry—the spinning of flax, the important middle process between the cultivation of flax, and the linen manufacture. It is to be expected that the parties concerned will themselves appreciate the fact that their only resource in their own interests is "Improvement of the flax cultivation, promoting the consumption of manufactures from flax, and cheap capital," to replace in its former position this branch of industry, native to all parts of Europe, for the benefit of the cultivator of the soil as well as of commerce.

The greatest improvements in twines, as well as in dyeing and finishing, are made by the English and French, and are such that manufacturers of other countries must make great exertions to keep pace with.

In "finishing," three principal varieties are to be distinguished:—

The English, so called "common finish," a dull soft finish, greasy to the touch.

The French, of two kinds, of which one resembles the English and the other is a waxed finish.

The "brilliant finish," hard and soft, which is applied in all countries in various forms with approximately similar results.

Linen thread is made up in England by weight, on the continent by measurement. At present, however, both methods are adopted in almost every manufactory. So long as it is not made compulsory to use metrical numbers, measurement, and weight, and to mark every packet accordingly, a certain degree of dishonest competition will prevail in this manufacture and be a heavy obstacle to the honourably disposed manufacturer. In England three established spinning and twine-making firms sent their goods to the Exhibition.

Marshall and Company (Leeds), sent their commonly adopted pound ball hank and bobbin threads. William Barbour and Sons (Hilden Flax Mills, Lisburn, Ireland), similar packages and specialities in "filling," from one to sixfold. T. Ainsworth (Cleator, Carnforth), thread in all English packages. T. Ainsworth was one of the first manufacturers to produce linen pirns well adapted for use in sewing machines. The bleaching and dyeing of these three exhibitors is beautiful.

Glossy linens depend a great deal on the manner of their arrangement. As a rule the so-called "adjustment" for the home market is exceedingly simple, but the wider the area of consumption extends the more do customers prefer outward appearance to substance, or not being possessed of sufficient knowledge to appreciate the latter, require the adjustment to be more varied and gay. Many exhibitions have already proved that in this matter it is possible to "have too much of a good thing." Many of the exhibitors' cases contained more paper, ribands, and labels than linen. The firm S. G. Fenton and Company (Linen Hall, Belfast), appear to be the most eminent in the art of tasteful adjustment. The adjustment of their exquisitely white linen displayed the most novel and tasteful varieties; queen's linen, family linen, shirting linen, drills, damasks, &c. were displayed in a neat and certainly not overcrowded fashion never before attained. On the other hand the funereal form of display of heavy linen for family use by two other Irish exhibitors must be condemned as an error of taste.

The Irish exhibition of linens was small, reckoned by the number of the exhibitors, but it contained some very meritorious productions. Dicksons, Ferguson, and Company (Linen Hall Street, Belfast), sent some linens and pocket handkerchiefs beautifully bleached. They excelled also in printed stuff for clothing. The exhibition of Jaffé Brothers (Belfast) was very rich. Besides their imperial fronting, heavy family, extra strong linen, beautifully ornamented grano de oro, &c., their bleached, embroidered, and printed linen and *batiste* pocket handkerchiefs were deserving of particular notice. The designs of these and of their linen for clothing were very full of taste. The assortment exhibited by C. Pegler, Junior, and Company (58, Briggate, Leeds), of Irish linens and unbleached pocket-handkerchiefs compares favourably with the Irish.

Linen picture goods. The English excelled on this occasion only in superfine œil de perdrix, Swedish, and a few other bleached tablecloths and napkins. Very few of the visitors to the Exhibition can have been reconciled to the taste of the designs of the natural coffee cloths of one Irish house, in which all that was not copied from the Gross Schonau original was very deficient in taste.

Jute, the fibre of Corchoris capsularis and Corchoris olitorius, is the most important of the many vegetable fibres that occur in East India, where it is cultivated in great quantities, particularly in Bengal. The plants there, in the same way as flax and hemp in Europe, are sown anew every year. Jute, however, requires less labour of retting and cleaning for use than the flax and hemp fibres. But it is not only the fibres of the plant and its woody parts and stem which is about an inch in thickness which are valuable, but the foliage also is used for a variety of purposes by the natives, and is especially prized as a favourite article of food. The seed is sown in April or May, favoured by the wet weather that generally prevails at that season. The plant requires about 100 days to ripen and is harvested in August. The fibre resembles that of Manilla hemp; it is of a reddish brown colour, not so coarse, but also not so strong as Manilla hemp. The quality varies in respect of fineness and strength with the fitness of the soil in different districts of cultivation. The finest quality is grown at Serajgunge, next to this follows that of Naraingunge, and the worst sort is Dowrah jute. The finer qualities are distinguished by a clear pale yellow, often silver grey, colour, and by the length of the fibre. Fibres are occasionally found 14 English feet in length. The common sorts are generally short, brown, with basty parts on them, and have very coarse, long, woody root-ends.

The Hindoos have been spinning and weaving a great part of the jute grown in Bengal from incalculable ages, and this industry provides the principal occupation of all the most populous districts of Lower Bengal. It is met with there in all classes of the Hindoo population and in every house, just as flax spinning was the national practice in Germany in former times. The natives prepare different woven stuffs from the jute, many of which are afterwards dyed; part they use for clothing but the largest quantity is made into bags for rice, sugar, cotton, and other produce, and these bags come into trade as an important article of East Indian export under the name of gunny bags.

According to earlier researches of Dr. Forbes Watson about 6,000,000 centners of jute are annually produced in East India, of which one-third is exported and the rest woven by the native population into gunny bags and other textile fabrics. Since the date of this return the produce must have considerably increased, for as the figures quoted below show, the export of jute from Calcutta alone amounted in 1872 to 1,891,000 bales, or about 6,000,000 centners for the year, and it may be assumed that the consumption in India has undergone no diminution, for, even if it be true that the hand weaving of the Hindoos is declining, the very extensive mechanical spinneries and weaving factories that have arisen in India of recent years are a very important new channel for the consumption of raw material on the spot which more than counterbalance the hand-weaving. Dundee is the site of the magnificent manufacture, rich in promise for the future, and produces

quite four-fifths of the whole English jute manufactures. The following figures are obtained from that place:—

The export of jute from Calcutta amounted:—

Twenty years ago, *i.e.*, 1852 and 1853, to			170,022 bales.
In the season	1868–1869	it rose to	962,487 „
„	1869–1870	„	987,314 „
„	1870–1871	„	1,377,165 „
„	1871–1872	„	1,891,912 „

The consumption of raw jute in the year 1872, and its approximate value after manufacture, was—

		Centners.	Thalers.
In Europe	Great Britain and Ireland	3,000,000	= 36,000,000
	On the Continent	750,000	= 9,000,000
In North America		1,176,000	= 14,112,000
	Total	4,926,000	= 59,112,000

The amount of the consumption of the rest of the world is not known. East India probably consumes as much as Great Britain and Ireland.

Marks and descriptions of the raw material are used in commerce, of all conceivable kinds, but the larger firms of position have their standard descriptions which form the standard by which quality is determined, and of these there are about six; fine quality, medium quality, common quality, low quality, rejections or common refuse, cuttings or root ends cut off; these last are used for the manufacture of paper, but go mostly to North America, where they are spun in for the weft of the common cotton packing cloths or cotton bagging.

As to the preparation of the raw material before it is put into the machines, this is often attempted in a variety of modes; but these have always reverted to the first known and apparently primitive process of sprinkling with oil or train oil and water. The processes of spinning and weaving are similar to those applied to oakum and flax. The coarse numbers up to No. 10 (60,000 yards to 20 lbs. weight) are spun like oakum, and the thread is called jute tow; the fine numbers up to 18 or 20 (60,000 yards to 10 lbs. weight) are spun like flax and then called jute line. The machinery has been materially improved during the last 10 years, if not in principle at least in strength and simplicity of construction. The fibre requires from its nature very strong solidly constructed machinery to work it. The weaving of the spun jute in like manner requires very strongly built machines, and a difficulty exists in this respect, the wefts losing some fibres and being weakened thereby, from the movement of the reeds on the loom. The finish of the woven fabric is also done by heavy calenders under great pressure between paper and iron rollers, the last partly warmed and partly cold. The dyeing of the jute is easy and inexpensive, but the colour seems only to lie on the outer surface of the separate fibres and not to be infused into their substance, which explains the cause of its ready disappearance, especially on exposure to the sun. Until recently it was only possible completely to bleach jute at the expense of its durability; but this drawback has at last been overcome.

With respect to the representation of jute industry at the Vienna Universal Exhibition, it was once more England that was distinguished by the almost total abstinence of her jute manufacturers from the international arena.

There was only the Barrow Flax and Jute Company, of Furness, to enable visitors to become acquainted with the English warp and weft twines, sacking weft, rose and blue coloured jute twist double thread, and with their excellent textile stuffs, mats, tarpaulins, and bags. Moore and Weinberg, of Belfast, were distinguished by their exhibition of printed carpets, twilled grain bags, &c.

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COTTON AND COTTON GOODS.

Report of DR. ALEXANDER PEEZ.

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Raw cotton, an article which in the year 1872 occupied 950 million guldens of the trade of the world, was only represented by five important exhibits at the Universal Exhibition:—(1.) The United States. (2.) East Indian cotton from British India, sole exhibitors, *the Government of Bombay, the Local Committee of Berar.* More than 700 samples of East Indian cotton, more than 100 samples of soil, agricutural implements, cotton seed, models and photographs of machinery and cotton plants. (3.) Egyptian cotton. (4.) Brazilian cotton. (5.) Cotton from Algiers. (6.) In addition to the above five important exhibits there were none but a few isolated samples, amongst which the fine cottons of Queensland and the Fiji Islands excited well deserved attention (England—Colony Queensland, &c.). These kinds are inferior to none represented in the Exhibition in the silky brilliancy, softness, and length of their fibre.

How entirely different is the cotton of India (from that of the United States)! The first glance at the cotton plants sent to the Exhibition showed that they are smaller, poorer, and more unequal, representing no really new introduction of cultivated plants, but accidental variations, in different qualities, from an ancient stock. All attempts to domicile the more highly cultivated American kinds in India have failed, and attention has in consequence been concentrated on improvement of the native species by skilled cultivation. The soil in India, deficient in moisture and richness, has to be artificially supplemented, and the English Government has taken in hand, with really admirable solicitude, to foster and promote the cultivation of cotton. It is well known that Government appointed commissioners in the more important centres of production, whose function was to advise native planters, to guide them, to supply them with cleaning machines and to watch the presses, that no effort should be spared to clean the produce as thoroughly as possible, and further to keep precise statistical records of the condition of the crops, the production, and exports. In the central stations of the cotton-producing districts, dispersed, we know, over different parts of India, the English Government has established model farms, "Government farms," in which everything is collected that is calculated to promote the cultivation of cotton, by example, instruction, and support. And the Exhibition gave us most interesting illustration of the extent to which this Government intervention is carried. From one of the local committees above mentioned, that of Berar, a display was made of more than 100 samples of the soil in which the cotton plant finds its nourishment. On account of the depth to which the roots penetrate, the subsoil has to be taken into consideration also. Here is to be seen the fine enriched clay of the valley of the Indus, along with the silicious samples sent from the high plains of Central India. The English Government has caused all these soils to be submitted to chemical examination, in order that they may be supplied, by judicious manuring, with the necessary ingredients, which are no longer plentiful in such quantity in the soil of India, over-cultivated from antiquity, as they are in many parts of America. It is notorious that considerable quantities of potassic salts have been exported lately from Stassfurt, for the purpose of manuring the cotton plantations in India. This action on the part of the English Government, in itself a most striking example of energy in promoting the economical prosperity of a nation, which the Exhibition gives us the opportunity of recognising, and in comparison with which the industrial training shops of Belgium, and even the labours of the Centralstelle of Würtemberg are mere moderate beginnings, deserves the highest appreciation from all practical and theoretical national economists. Not obstinately adhering to the well-known principle of "laissez aller," nor shunning the reproach of a slight inconsistency, which might be found in their departure from the English system of "buying in the cheapest market" (which, in this instance, would plainly mean America), the Government intervenes in a wise and provident spirit for the guidance of the natural

course of production and trade, in order to bring help to a branch of industry which would otherwise have difficulties in developing itself in the face of powerful competition. We may remark in passing, that the English Government has been induced to this course by scientific as well as by political motives, which indeed are universally inseparable. By the forced cultivation of cotton in India, not only the quantity of this indispensable raw material for manufacture is increased, but this produce is a means of making the Indian native populations more contented by increasing their prosperity and of uniting them to England by trade in this article; whilst England at the same time secures a market for manufactured goods, which gradually grows more remunerative and important as India has more and more cotton to deliver to Europe. But not less important is the consideration that the plantations of cotton in India contribute most largely to modify as far as possible the dependence of the English cotton manufactures on the United States, which was formerly, *i.e.* before the civil war in America, much greater than now. The danger of this dependence was less whilst the slave barons ruled at the Capitol at Washington, for they had many important interests in common with the English. Instead of the landlords it is now the manufacturing population of the north who guide the helm of the state, and have established an industry for themselves in American cotton spinning and weaving, which has already not only beaten the English yarns and stuffs almost completely out of the North American market, but begun to compete with them also in South America and Eastern Asia. A second England is growing up there, which has the advantage over the Old England of the immediate proximity of its raw material, and by the sale of its superabundance to the latter will equalise the only weak point in which its inferiority to England must be admitted—its scarcity of capital. The market in Europe for their surplus cotton has, to the great gain of the United States, resumed of recent years its old dimensions. At the Universal Exhibition of Paris in 1867 it was still doubtful whether the United States, deprived of slave labour, would ever regain their former position in trade. Slowly but irresistibly, however, America resumes her old predominance. "Free labour and guano" is their novel but logical device. The high wages paid to free labour are rendered possible by free manuring, and larger harvests than heretofore are now won with equal labour. The difficulty of attracting sufficient labour was surmounted by allotting to labour a proportion of the gains. The labourers' earnings in this way rise with the quantity produced, and it is a successful arrangement in its humane character, which replaces the most imperfect system of labour, slavery, by the most perfect, the participation of the labourer in the gains of the undertaking that employs him. It is asserted that in the direction of energy to the quantitative results, the former reliable cleanness of the American cotton exported to Europe has been deteriorated, but on the other hand the progress that has appeared in the productions of the United States of recent years is undeniable. The North American harvests amounted in—

1856–1857	to 2,990 m.	bales.
1857–1858	„ 3,118 m.	„
1858–1859	„ 3,850 m.	„
1859–1860	„ 6,075 m.	„
1860–1861	„ 3,660 m.	„
1867–1868	„ 2,577 m.	„
1868–1869	„ 2,414 m.	„
1869–1870	„ 3,155 m.	„
1870–1871	„ 4,347 m.	„
1871–1872	„ 2,975 m.	„
1872–1873	„ 3,700 m.	„ (estimate).

It appears from this comparison that the harvests in the United States began, in 1869–1870, the recovery of their average before the war; and experienced persons expect a further increase, and a more successful competition with other countries, to occur next year. To understand these relations numerically we append the following summary representing the shares in the whole supplies sent to European cotton markets, contributed

respectively by the United States, East India, Brazil, Egypt, and the West Indies, with the addition of the less important sources of production; during periods of four years from 1846 to 1870, and in the years 1871, 1872, and 1873 (estimated) :—

In thousands of original bales; 1,711 therefore indicates 1,711,000 bales.

Exporting Country.	1846 to 1850.	1851 to 1855.	1856 to 1860.	1861 to 1865.	1866 to 1870.	1871.	1872.	1873.
United States -	1,711	2,290	2,865	793	1,653	3,114	2,036	2,466
East Indies -	232	352	540	1,380	1,601	1,538	1,696	1,550
Brazil - - -	131	149	153	201	614	680	1,006	760
Egypt, &c. -	129	214	162	418	418	445	513	560
West India, &c.	30	30	35	73	175	240	237	240
Total -	2,233	3,035	3,755	2,865	4,481	6,017	5,488	5,576

It appears from these tables that the United States shipped in the period 1856–1860 a quantity of 1,254,900,000 English lbs. of cotton to Europe; during the civil war 1861–1865, this export was diminished to 347,300,000 lbs. per average year; but with the plentiful harvest of the year 1871, the highest average previous to the war is exceeded. The result, however, differs somewhat, if the per-centage share is taken as a standard of comparison, for the United States have not yet recovered to their former 80 per cent., or four-fifths of the whole European cotton supply.

Here then we have the beneficial effects of the civil war presented, for the premium held out, and really paid, in consequence of the high prices during the crisis, was so high that it gave a powerful impulse to the cotton cultivation in East India, the West Indies, Brazil, and Egypt, and all these countries increased their production, and continued to maintain a considerable share in the cotton trade when the United States had again entered on the market with all the power that they derive from their happy advantages of cultivation.

This is more particularly true of East India. Thanks to the American blockade, to the untiring energy of the English Government, and to the improved conveniences of transport provided by the construction of the Indian net of railways and the Suez canal, the portion of East India, which was rapidly increasing as long ago as the years 1840–1860, has risen from 10 to 13 per cent. before the war, to 24 to 31 per cent. since the war. Besides this the East Indian produce has improved in quality, and large quantities of the better sorts of cotton are now imported into Europe from localities formerly of indifferent reputation. The production of Egypt and Brazil has increased, approximately, in the same ratio as that of East India. The active competition that has reigned among the various producing countries was sustained by the higher prices that have been realised since the American war until now.

Before the war the average price of cotton imported to England was:—

1856 - -	- 5·56 per lb.
1857 - -	- 6·60 „
1858 - -	- 6·10 „
1859 - -	- 6·20 „
1861 - -	- 5·75 „
1862 - -	- 7·10 „

During the war the prices were :—

1862 - -	- 13·90 per lb.
1863 - -	- 20·00 „
1864 - -	- 21·80 „
1865 - -	- 15·10 „

After the war the average prices were :—

1866	- -	13·00 per lb.
1867	- -	9·75 „
1868	- -	9·20 „
1869	- -	10·50 „
1870	- -	8·80 „
1871	- -	7·50 „
1872	- -	8·75 „
1873	- (estimated at)	7·75 „

It is seen by these figures that, setting apart a steady tendency to weakness since 1866, prices have been maintained since the war at a higher average than they ruled before it. If this fact (which can scarcely be believed) is not due to a change in the value of money, it is attributable, America now, as formerly, ruling the market, to the increased cost of free labour in the States, and the taxes caused by the war. Europe has thus to contribute to the costs and burthens imposed by the rebellion of the Southern states by the increased price she pays for her cotton. The difference from former prices amounts on the whole to 1½*d.* to 2*d.* per lb., or 20 per cent. of the value. This is therefore the standing premium offered to the East Indies, Brazil, and Egypt, &c., in excess of former prices.

Many circumstances show that the cotton manufacturing industry is not promoted by this rise of prices, but that it has been the cause of the very depressed condition of cotton manufacture in most of the countries of Europe. Dearness diminishes consumption, and promotes the introduction of substitutes. Just in the same way as the Asiatic and Brazilian cottons gained a great advantage by the continued absence of North American cotton from the market, the dearness of cotton during and since the war has benefitted flax, hemp, and the cheaper sorts of wool, *i.e.*, those articles best adapted to compete with cotton. The following tabular statement borrowed from the "Economist," gives much interesting information of the relations of price among these articles. Taking the average price of the six years 1845 to 1850 as a basis, say 100, then the variation of prices has been :—

Years.	Cotton.	Raw Silk.	Flax and Hemp.	Wool.
1845 to 1850 - - -	100	100	100	100
1851 „ 1 January - -	86	113	94	113
1853 „ 1 July - - -	—	117	110	125
1857 „ - - -	95	204	121	146
1858 „ 1 January - - -	73	156	113	105
1863 „ - - -	314	149	136	141
1864 „ - - -	460	139	137	154
1865 „ - - -	363	157	132	159
1866 „ - - -	383	200	140	144
1867 „ - - -	227	183	116	144
1868 „ - - -	100	161	121	115
1869 „ - - -	155	183	124	104
1870 „ - - -	173	174	116	96
1871 „ - - -	118	183	116	88
1872 „ - - -	141	169	115	133
1872 „ 1 July - - -	136	178	120	151
1873 „ 1 January - - -	132	169	118	157

It is shown by this comparative statement that the great rise in the price of cotton in the years 1863–1866 was not shared by that of silk, although it was by that of hemp and flax, and most considerably of all by wool. Cheap qualities of wool had risen 59 per cent. on the 1st January 1865 ; but they subsided along with cotton, and the produce of the flocks being plentiful, declined materially below the quotation of 1857. Against this, recent years

have brought a considerable rise in wool quotations, re-establishing thus their right proportion to those of cotton.

Let us now take a hasty review of the routes that the cotton trade of the world has adopted. We perceive that the most important change since the Paris Exhibition of 1867 lies in the new route by which East Indian cotton is brought to Europe. The greatest part of the crops of East India is now brought by screw steamers through the Suez canal, and the advantage gained by this consists not only in easier and shorter communication and rather cheaper freight, but also in the circumstance that the new harvest no longer reaches the European market in the second half of the year, as it used when it came round the Cape, but in the first.

The shipments from East India to Europe amounted in 1872 to 1,700,000 bales of 360 lbs. English weight per bale, representing a value of 140 millions of guldens, Austrian currency silver, and they were addressed to Liverpool, Havre, Barcelona, Marseilles, Trieste, and Odessa.

Of the United States harvest of 1872, amounting to 3,056,000 bales, of 439 lbs. per bale, English weight, 1,099,000 bales went into manufacture in the country, 1,454,000 bales went to England, 319,000 bales to Germany, Austria, Switzerland, and Russia, and 184,000 bales to France (of which part was for Switzerland).

As to Egypt, the export from this country began in 1821 with 964 centners; in 1831 it was 186,675 centners; in 1841, 193,507 centners; in 1851, 348,439 centners, and in the year 1873, 2,168,181 centners. The consignment of Egyptian cotton, which is generally preferred where cotton above number 40 is to be spun, was in 1872 divided among the under-mentioned countries :—

	Centners.
England - - - -	1,667,385
France - - - -	186,426
Italy (Venice) - - -	143,964
Austria - - - -	91,140
Russia - - - -	62,676
Other countries - - -	16,590
Total - -	2,168,181

After England, Switzerland is the most important consumer of Egyptian cotton. The consumption of Switzerland is partly included in the consignments to France and Austria, but especially in those to Italy (Venice).

The export of Brazil, which amounted to 1,920,000 centners in the years 1870–1871, arrives in small bales of 150 lbs. English weight at Liverpool, Hamburg, Havre, and Barcelona.

Finally, the Levant, producing altogether about 300,000 bales, of 385 lbs. English weight, sends to Austria about 100,000, to Spain 60,000, to England 40,000, and to France 40,000 bales, whilst there may be about 60,000 bales reserved for home consumption.

A comparison of all these statements makes it manifest that England plays by far the leading part in the cotton trade. Out of 5,488,000 bales sent to Europe in the year 1872, 3,880,000, or a great deal more than two-thirds, came to England. 743,000 bales of this quantity were then reshipped to the continent.

This dominating position is of the greatest value to England, not only for the profit attaching to the intermediary traffic, but also because, the market being in England, the English spinners get the first choice and best opportunities of purchasing, and further for the employment it affords to the English mercantile marine, and the market it ensures to English manufactured goods in payment for the quantities of cotton imported through England by continental countries. Naturally, these reasons are so many motives for the continent to liberate itself from the English middle trade. But this emancipation is by no means easy to effect, England possessing an immense power in her wealth of capital, and more especially in the great demand that is created by the 39½ millions of spindles that exist in England, as against about

19 millions on the whole of the continent. But the process of emancipation is advancing. This is shown by a comparison of the gradually declining consignments of cotton to the continent through the English middle trade. These amounted—

In 1866 to	1,136,000 bales.	In 1870 to	658,430 bales.
„ 1867 „	1,015,000 „	„ 1871 „	910,330 „
„ 1868 „	915,120 „	„ 1872 „	743,000 „
„ 1869 „	791,850 „		

It is to be hoped that the increase of indirect importation that arose from the year of war in 1870–1871 will be regulated again in the current year, 1873.

Amongst the ports of Germany, Bremen is the one that has always devoted especial attention to direct trade. Of the 1,122,233 Zoll centners taken by this North Sea port in the year 1871, only 87,636 centners were indirect, against 1,034,597 centners of direct import. In the year 1872, however, this direct import fell to about 700,000 centners. The direct imports of cotton were :—

Harbour.	In 1871.	In 1872.
Bremen	316,000 bales.	193,000 bales.
Amsterdam	163,000 „	162,000 „
Antwerp	110,000 „	144,000 „

The increased imports of Amsterdam and Antwerp, which date from recent years, are explained by the circumstance that Alsace and Switzerland now receive the greater part of their cotton by way of Holland and Belgium, and no longer, as formerly, though France.

For the rest, the country that has made the greatest progress towards emancipation from England is France, which receives the cotton from the Mediterranean and East India at Marseilles, and the American cotton at Havre. To produce a precisely similar position for Germany and Austria must be the task of the ports of the North Sea, Bremen and Hamburg, and for the Mediterranean, Trieste. Their mission is to fetch the cotton direct from the producing countries, and distribute it to supply the demand of Central Europe. Historical and geographical conditions have impelled Austria, from the commencement of her cotton manufacturing industry, to draw her supplies of raw material principally from the imports into Germany. In the year 1871, out of a total importation of 1,204,179 Zoll centners, more than one third, or 433,380 centners, came by way of Germany. But a totally new feature is the fact that of recent years Germany also receives no inconsiderable quota of her imports of East India and Levant sorts through Austria. The figures of this trade are :—

Year.	Import of cotton into Germany through Austria.
1862	19,736 Zoll centners.
1863	26,999 „
1864	32,159 „
1868	89,568 „
1869	104,361 „
1870	183,433 „

Whilst the imports in the years 1862 and 1863 are confined to moderate quantities of Levant cottons, since 1868 the influence of the Suez canal is notable in the larger deliveries of East India cottons. The official statistics of later dates are wanting, but from the reports of the Austrian Southern Railway, it appears that the quantity of cotton carried in 1871* by way of Trieste, Venice, and the Brenner, to South Germany, was 367,311 centners, and in 1872, 184,427 centners. These figures only apply to the route through the Brenner pass, but cotton was sent also by way of Passau and Bodenbach, so that it is safe to assume that the transit of cotton to Germany in 1872 exceeded the amount of 1870, even if it did not equal that of the exceptional year 1871.

* The traffic avoided French railways in this year on account of the war, and found its way to South Germany and Switzerland by the neutral ports of Trieste and Venice.

It becomes every year more apparent that, in consequence of the Suez canal, the position of Mediterranean ports for the direct importation of cotton is singularly advantageous. Trieste and Venice especially have the advantage of the whole of the distance from Trieste to Liverpool, whilst in former times, when the East Indian cotton went round the Cape, the giant port of England had a material advantage over the ports of the Adriatic Sea. The importation of cotton into Venice has increased from about 20,000 Zoll centners in 1868 to about 260,000 centners in 1871. In 1872 there is a falling off to about 150,000 centners. The importation by Trieste has been—

In 1867	270,550	Zoll centners.
„ 1868	326,567	„
„ 1869	343,375	„
„ 1870	461,859	„
„ 1871	775,233	„

The cotton imported to Trieste in 1871 was—

From East India	307,965	centners.
„ Egypt	212,215	„
„ Turkey	136,809	„
„ England	88,141	„
„ United States	19,978	„
„ Greece	4,238	„
„ Brazil	1,703	„
„ Other countries	4,183	„
Total	775,233	„

These data give a fair view of the Trieste cotton trade, and it shows that with the exception of 88,141 centners imported from England, it was all for direct trade, although Trieste acts rather as broker and forwarding agent than as merchant, and the payments to Bombay are still made through the medium of English credits.

Cotton Spinning and Weaving.

Although a series of important changes have taken place in the production and trade in the raw material since the last Universal Exhibition of 1867, the same cannot in any sense be said of the cotton manufacturing industry. Leaving out of consideration the printing, in which the application of a new colouring material has attracted much and well merited attention, the Vienna Universal Exhibition presented us with nothing that could be described as a suggestive invention, and scarcely with an improvement of importance in cotton manufacture. Both spinning and weaving continue on their accustomed track. This was very prominently observable in the machinery department, where, in the matter of our branch of manufacture, a striking barrenness was evident, forcibly illustrated by the circumstance that the firm of Platt, Brothers, and Co., of Oldham, known for their extensive and excellent manufacture of looms, only sent to this Exhibition machines for working in the manufacture of cotton goods. The science of cotton manufacture may have made many steps in smaller details; manufacturers have no doubt learned the art of spinning useful thread from the inferior qualities; improved separators and self-cleaning carding engines have been exhibited; and combing machines are no longer applied only to the finest numbers; the number of self-actors has everywhere increased; in short, spinning and weaving have normally developed, and many deficiencies have been made good, many weak points improved; but a material change since 1867 is not to be seen, for which reason we can deal more briefly with this portion of our report.

The situation of the various centres of the spinning industry has been already indicated by our statements respecting the consuming markets for raw cotton. Although historical and not economical reasons have influenced the selection of sites for cotton spinnery in various countries, yet two groups may be distinguished:—1. Spinneries, relying on coal from England, lie near

the sea, from which they receive the oversea raw material. To this class belong the spinneries of England, Normandy, Catalonia, and the great Russian spinneries in the neighbourhood of St. Petersburg. 2. Spinneries advantageously situated for the application of water-power lie inland. They surround the Alps like a belt, are most numerous in Switzerland and Vorarlberg, are continued by the Upper Germany spinneries to the Danube, form an important centre of industry again in Lower Austria, and continue through Styria and Gorz, almost to the Adriatic Sea. Their motive power is supplied by the perennial waters of the Alps, formed by the melting of the snows and glaciers—this, however, is now in many localities necessarily assisted by steam power. A smaller zone of cotton spinneries has been formed in Saxony, Bohemia, Bavaria, and Silesia, on the water-power of the Erz and Riesen mountains. The spinneries of the United States form a peculiar middle class, which, grouped in Massachusetts, New York, and Pennsylvania, belong, according to their respective situations, to one or other of the groups, frequently to both.

If we give effect to considerations of commercial policy we find the cotton factories of the United States and the European continent, which seek protection against the preponderance of England by taxes more or less considerable, in an attitude of opposition to the English spinneries. The relative importance of these three groups is expressed by their share in the cotton trade. The "Economist" gives us the following particulars on this subject:—

Groups of Countries.	1860.		1870.		1871.		1872.	
	Thousands of bales.	Per centage.	Thousands of bales.	Per centage.	Thousands of bales.	Per centage.	Thousands of bales.	Per centage.
England -	2,817	50·6	2,697	52·6	3,118	48·3	2,893	49·0
The Continent -	1,749	32·2	1,521	29·7	2,167	33·5	1,938	32·8
United States -	947	17·2	909	17·7	1,176	18·2	1,064	18·2
Total -	5,568 (*sic.*)	100·0	5,127	100·0	6,461	100·0	5,895	100·0

From this statement we see that the relative importance of England, the Continent, and the United States has undergone no change of importance since 1860. England, which in 1860 consumed 50·6 per cent. of the whole of the cotton spun, had still 49·0 per cent. for her share in 1872, and of the 1·6 per cent. lost, 0·6 per cent. went to the Continent, and 1·0 per cent. to the United States. The loss is of so much the less consequence to England that in the period 1860–1872 her fine spinning was so much improved that a higher value could be spun from a less quantity of raw material.

The following are the statistics of spindles and consumption of raw material in the above-mentioned three groups in 1872:—

Country.	Number of spindles.	Consumption per spindle in lbs.	Total consumption.	
			lbs.	Bales of 400 lbs.
England -	39,500,000	32	1,264,000,000	3,160,000
The Continent -	18,580,000	43	800,000,000	2,000,000
United States -	8,350,000	57	476,000,000	1,190,000
Total -	66,430,000	38·28	2,540,000,000	6,350,000

This shows that the whole continent of Europe and the United States taken together, only possess 26,930,000 spindles, against the English 39,500,000; but that their total consumption of 1,276 millions of pounds has overtaken that of England of 1,264 millions in 1872. The reason of this circumstance is in the fine spinning of England. If we compare the relations of the most important centres of European industry together, the following statistics give us the consumption of raw material, stated in thousands of bales :—

Country.	1860.	1870.	1871.	1872.	Alteration from 1860 to 1872.
England - -	2,758	2,804	3,495	3,137	+ 13·8 per cent.
Central Europe -	754	734	1,117	1,013	+ 34·3 ,,
France - -	728	433	595	596	— 18·1 ,,
Russia - -	278	282	519	500	+ 79·9 ,,
Spain - -	156	155	199	175	+ 1·2 ,,

We see from this that it is in Russia that the consumption of raw cotton has increased most rapidly. Central Europe includes Austria, Germany, Switzerland, Holland, and Belgium. The increase of 34·3 per cent. in this group is not only internal but attributable also to the accession of Alsace to the German empire.

The following statements respecting the number of spindles in the various countries, the consumption of cotton per spindle, and the weekly consumption of the year 1872, are taken from English consular reports, and statistical tables by Herr Ott-Trümpler, of Zurich, and have been completed in several respects by the most recent data from the Universal Exhibition of 1873 :—

Countries.	Spindles.		Consumption per Spindle.	Total Consumption.		Average weekly Consumption.	
	Number.	Per cent.	lbs.	lbs.	Bales of 370 lbs.	Bales.	Per cent.
England - - -	39,500,000	59·1	32	1,264,000,000	3,416,220	65,690	48·86
United States -	8,350,000	12·5	57	476,000,000	1,286,480	24,740	18·40
France - - -	5,200,000	7·7	38	197,600,000	534,000	10,270	7·60
Germany - - -	5,100,000	7·6	45	228,000,000	616,200	11,850	8·80
Switzerland - - -	2,060,000	3·1	27	56,600,000	152,970	2,940	2·20
Russia - - -	2,000,000	3·0	60	120,000,000	324,320	6,240	4·70
Austria - - -	1,600,000	2·4	67	106,900,000	288,920	5,560	4·10
Spain - - - -	1,400,000	2·4	48	67,200,000	181,620	3,490	2·60
Belgium - - -	650,000	1·0	43	27,900,000	75,540	1,450	1·10
Italy - - - -	500,000	0·7	48	24,000,000	64,860	1,250	0·90
Sweden, Norway, Denmark	300,000	0·5	60	18,000,000	48,650	930	0·70
Holland - - -	230,000	0·3	43	9,800,000	26,750	51	0·04
Total or average -	66,890,000	100·0	40	2,696,000,000	7,016,510	134,461	100·00

The cotton industry of England, with 39½ millions of spindles, and 400,000 power looms, forms the most gigantic manufacturing power that exists in the world. In the year 1872, England used in manufacture 1,175,345,000 pounds weight of cotton, and spun from it 1,040,380,000 pounds of yarn, of which 211,940,000 pounds went into export as yarn, and 698,840,000 pounds as woven stuffs, and 129,600,000 remained in the country for home consumption. The value of the exported yarn was 167 millions of florins, of the exported stuffs 699 millions of florins, and of the cotton goods used in the country 156 millions of florins. The value of the whole produce is calculated to amount to 1,022 millions of florins. Deduct from this 480 millions for the cost of the raw material, and 542 millions of florins remain earned by England in one year as wages, interest on capital, and profit of

trade. In spite of this, two clouds are appearing on the horizon, which may become dangers to the English cotton manufacturing industry in the course of time. These are, the price of coal, which has ruled high of recent years and has raised the cost of mechanical motive power in England, and the increasing exactions made by the labouring classes, who in the year 1872 refused to spin the short staple Surat cotton.

To the Universal Exhibition at Vienna England only sent such cotton goods as find an exceptionally ready sale in Austria and the adjacent countries. These are fine yarns, throstle yarn up to number 120, thread for embroidering and sewing cotton, and excellent woven stuffs; these last peculiarly prominent from the gigantic manufactory of Horrocks, Miller, and Co. at Preston, which works with 200,000 spindles and 3,644 looms.

Printed Cottons.—Of England's incalculable produce, scarcely a specimen was sent to the Universal Exhibition, because, thanks to the good development of Austrian manufacture, it finds scarcely any market in this country. The English establishments have thoroughly carried out the principle of partition of labour, so much so that even the finishing is often not done at home; but the enormous extent of the printing is so much the more colossal. The firm Potter, of Manchester, alone prints a million pieces annually with 42 machines, which is equal to the whole production of England at the close of last century. Glasgow has quite recently attempted to produce the superfine Mulhausen stuffs, and the most expensive designers of Paris are employed for the Scotch manufacture. The English and Scotch printing factories are worked altogether by machinery, and threaten not Switzerland only, but also Mulhausen itself, unless this latter shows increased energy, with a dangerous competition.

We close our review with a comparison of the annual production of the largest existing establishments:—

England:—	
Potter, of Manchester	1,000,000 pieces.
Daglish Falkoner, of Glasgow	500,000 „
James Black, of Glasgow	500,000 „
Continent:—	
W. Leitenberger, of Kosmanos	400,000 „
Dolfus Mieg, of Mulhausen	350,000 „
Liebermann, of Berlin	300,000 „
Schlieper and Baum, of Elberfeld	250,000
La España, of Barcelona	200,000 „

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WOVEN GOODS GENERALLY.

Report of LUDWIG GLOGAN, *Manufacturer, Teplitz.*

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England rules the Italian market and the Levant with her Nottingham goods, and the factories at Chemnitz and those more recently established in Stuttgart for this much-admired industry, have not been able to oust England from her position of domination, which, however, only extends to this article.

It is to be regretted that England, which makes excellent machines for this manufacture, sent none to the Exhibition.

On the great field of the woven goods manufacture, we found 92 exhibitors at the Vienna Universal Exhibition, which, distributed to their several countries, fall into the following groups:—

England	2
France	12
Belgium	1
Switzerland	5
Italy	3
Germany	41
Austria	28
Total	92 *exhibitors.*

We will begin our review with England, which, next to France, produces the best and soundest goods. England was represented by the large firm I. and R. Morley, of Nottingham and London. The manufactures exhibited were jackets, stockings, socks, &c., and were distinguished by excellence of the material and regular and exact work in all respects.

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SILK AND SILK WARES.—ANTON HARPKE.

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The silk industry of England was only sparingly represented. The beautiful poplins of Messrs. Pim, Brothers & Co., R. Atkinson & Co., of Dublin, and stuffs for cravats and neckties, &c., deserved to be noticed. The riband industry of Coventry, which astonished the world in 1862 by its imposing dimensions, but was not satisfactorily represented in 1867, was this time entirely absent.

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FRINGES, TRIMMINGS, &c.—CARL GIANI.

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North America and England brought nothing to the Exhibition, although both States, especially England, had every reason to show those peculiar fringes and tassels, which, impressed with the severe character of old England, combine the perfection of solid splendour with the national pedantry.

India, with its fairy like stuffs and laces, confused the boundaries that separate lace making from "passamenterie;" but she shews us again in any case that the cradle of humanity is also that of good taste. We do not find here, as in the West, the works of the joiner and the turner made the model to be followed. Here, for example, the tassel is, what from its nature it ought to be, a bush of thick pliable threads which are confined at certain points by a net of thread, and ornamented only with decorations of a textile nature. Technical art itself may be more perfect; but aberrations from the given material and its natural conditions are to be unconditionally rejected from the point of view of good taste.

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EMBROIDERY AND LACES.—DR. FERDINAND STAMM.

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We have to distinguish, in lace manufacture and embroidery, between hand work and machine work. The loom was introduced into England for ground of lace in the year 1782; the bobbinet machine in 1809; in 1850 the sewing machine was introduced into the United States of America; and at the Exhibition of 1873 the embroidering machine is exhibited. The mechanism of the machine therefore has challenged the dexterity of the female hand in every department of labour, and, as it is impossible, in the free development of the forces that act upon the whole area of industrial enterprise, for the machine to be ever again suppressed, or for the woman's hand to be utterly conquered and paralysed, the end of the struggle can only be a compromise in which the proper parts of the work will be alloted to the hand and the machine respectively, and their provinces defined. In the beginning it is true the machines spread dismay among the lace makers, for there was many a "deception" (to use the mildest term) in the trade, and machine-made lace was given out for "real lace;" the introduction of the sewing machine

also robbed many of their bread ; and the embroidery machine of this Exhibition will create new fears in its turn ; but the handworkers must not let their courage fail ; the encroachment of the lace machine has been successfully resisted in England, France, and Belgium ; in these countries we see the hand lace-making flourish side by side with the machines ; and in Bohemia and Saxony, which suffered a great deal in this struggle, the hand lace industry has recovered new life, as the Exhibition proves. But the needlewomen and lacemakers can always as yet retire to a province where machinery cannot follow them. This Universal Exhibition of 1873 has a peculiar attractiveness, because in it is presented, for the first time, an almost complete general view of all countries together ; and from this view we are able to conclude that, in the production of embroidery and laces, there are still a number of countries quite undisturbed by the contest between the machine and the human hand.

Embroidery by hand.—Universally cultivated as embroidery is throughout the East, where the light hangings, the tents, and other slight coverings from the heat of the sun give plentiful material and occasion for the introduction of ornamental work, India may be described as its proper home. The English accordingly have brought to the Universal Exhibition of 1873 very beautiful specimens of embroidery from India, amongst them shawls and chamber hangings rich in art, and especially embroideries in gold. Those are to be considered the most costly and beautiful in which gold forms the ground of the embroidery, and the design is worked in silk of various colours. Other sorts of embroidery in colours from India, give evidence of the high state that embroidery has reached among this people, who surpass most others in artistic dexterity and feeling, in imagination, and appreciation of colour harmonies ; but this exhibition was inferior to those of London in 1862 and Paris in 1867, and indicative rather of retrogression than of progress.

The English have been the masters of beautiful India for a long time now, and the industry of the population is under their protection. Now, it might have been expected that the English would have derived the greatest benefit from the excellent work and high art industry of the peoples with whom they stand in the closest connexion of intercourse by applying these models to improve the art features of their own manufactures ; that they would especially have regulated their sense of colours after the Indian models, and utilised the rich ornamentation of India for adding richness to their own. There was no lack of practical instruction by students of art who attempted, by the publication of very valuable works, to make this school of ornamentation universally known in England. And yet most unaccountably the contrary process prevailed and continues to prevail, as the English, in the Exhibition of 1873, have perhaps unconsciously betrayed.

Instead of the introduction into English goods, of the beautiful and genuine colours that the Indians so well know how to produce, and the gain of a higher, and always available value for English stuffs, they introduce the fugitive aniline colours, which are endangering the reputation of their textile industry in general, into India, and spoil the artistic woven goods and embroidery with them. Instead of the introduction of the good models and Indian ornamentation into England they weave goods in India on Scotch patterns, monotonously chequered patterns, grey in grey, or in combinations of colour full of faults.

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Hand Lace.

The London International Exhibition of 1862 made the English laces popular. Not only was there an admirable display of lace in the Exhibition Palace ; but that worn by the ladies on their Sunday promenade in Hyde Park in the form of veils, mantillas, shawls, and trimmings, was so beautiful, so full of art and so rich that the connoisseur was enraptured with it. The refinement of the delicate lily complexion of the light-haired Englishwomen is increased by a lace veil ; and their refined features and form increase the delicate effect of the lace. The visitor from the south might mistake these women, as they pass along the green velvet sward of the park, for the impersonations of the fairies in a fairy story.

There was only a small exhibition of hand-made laces from Great Britain, but this was all most excellent and proved that this branch of industry main-

tains its old high rank. There is nothing new amongst them that calls for attention, unless it be the "Frivolités" netted with a shuttle, which are exhibited in the English department as employment for schools. The same work appears among the dilettante and the school works of other nations, especially Austria. It seems a passing frivolous conception impossible to last, and the lace is much too open. Its mechanical qualities do not admit of the execution of any fine design. We leave it to other commentators.

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SHAWLS.

Report by EMANUEL THIEBEN, *Shawl Maker, Member of the Chamber of Trade and Commerce of Lower Austria.*

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India. The history of the origin of the Indian manufacture of shawls is not known, but it is certainly very much more ancient than the data hitherto possessed on the subject would indicate. The oldest records go back to two centuries before the birth of Christ. In the ancient patriarchal times of the race, and from the Mohammedan epoch up to our own times, the house manufacture of Cachemir shawls appears to have incurred but few vicissitudes, but there is reliable indication that an important market for these goods existed in all parts of the East, and that it flourished in every direction. The tedious and complicated process of manufacture was never in a position to satisfy the demand, and this was the first cause of a great rise in the price of the article. About 20 years ago, under the regency of Gholab Sing, this branch of manufacture underwent a great change by the emigration of the best weavers of shawls in Cachemir, in flight from the oppression of the chief, to British territory in and around Lahore, where they settled and made this neighbourhood the centre of a shawl manufacture, which, in extent far surpasses that of Cachemir. But the migration of the weavers was not so beneficial to the artistic value of the article. The predominating influence of foreign agents from England, and more especially from France, has supplied a great increase of capital and enormously increased the quantity of the produce; but the pattern begins visibly to lose its originality. Ominous signs of decay are already to be traced in two circumstances: the enormous increase of the price of older shawls, and the competition, now very great, among the few native workers who keep aloof from occidental influence, and deal with their produce among each other. At the head of this national industrial movement stand mostly individual native chiefs. The Indian shawl manufacture was to be found in the Exhibition in the proper groups in France and especially in British India. Those among English manufacturing and export firms who sent the best articles were the committees of Madras, and the Panjaub, Devisahai and Chamba Mal in Amritsur, Ahmad Shah and Ahsan Shah in Ludhyana; finally the well known house of Farmer and Rogers of London.

The Punjaub exhibited decidedly the most original patterns and the purest webs; the London house some richer sorts. It is uncertain, from the defective description, to whom the striped shawl patterns belonged; I believe to the Mohammedan firm Ahmad. They indicate a lamentable falling off in this beautiful branch of manufacture. Some six or eight shawls displayed in the centre window of the principal gallery may be considered of greater artistic value. Some of these recall recollections of the former vigour of Indian fancy. A figured design composed in concentric circles, recalled Byzantine patterns and displayed some, if not national, yet highly interesting details. On the whole the conclusion to be drawn from the collection displayed is that the realistic notions and commerce of the west have reacted on the industry, and that French influence or artistic conception is unfavourable. The original Indian patterns are passing away from the world.

England.—It is greatly to be regretted that England, the country of practical industrial productiveness, the country that first made us acquainted with the beautiful productions of India, and that by material mechanical

improvements established the continental shawl weaving on a firm basis, the country whose production in this branch is not to be lightly esteemed, was represented at the Exhibition by only one of her manufacturers of shawls. At London in 1862 there were 12 firms on the spot; at Paris in 1867 there were only four; in 1873 there was only one and that one Scotch—Kerr, Scott and Company of Edinburgh and London. The shawls sent by this firm do not display the most perfect designs, nor the most successful shades of colour, whilst they contain many kinds of wool. In the Paris Exhibition, at which, as we have said, England was feebly represented, one important firm from the cradle of English shawl manufacture was prominent. This was Clabburn and Company of Norwich, who exhibited their greatly admired patent shawl and beautiful Indian imitations. But on the present occasion we have absolutely nothing that deserves to be noticed.

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READY-MADE CLOTHES.

Clothes and Costume for Women.

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Report of Ignaz Ortmann, *Dealer in Fashionable Goods, Vienna.*

Passing through the Hall of Industry in the spirit from east to west, we perceive standing before us, at the entrance of a transept on the left hand a richly dressed lady from India, who gives us satisfactory evidence of the extraordinary gifts of invention that the women possess for the decoration of their bodies. The bust of this Indian lady was covered by a closely fitting jacket made of a nicely worked silk stuff of green levantine (twilled sarcenet); under which the chemisette and arm-coverings, made of gauze, were visible. A skirt of heavy blue silken stuff fell down in folds from the hips to the feet. Both the jacket and the skirt were ornamented with many trimmings of gold and silver. Both pieces of dress were confined at the waist by a girdle of gold lace, the two ends of which formed a rich and hanging tassel of gold. A veil of red bobbinet tulle, reaching from the head to the knees, and bordered at the edges with rich gold and silver ornaments, hung down over this costume. The ears of this lady were fitted with immensely valuable earrings, the nose was transfixed by a golden oval ring of at least ten centimetres in diameter, and on the left nostril there sat a gold button or rosette ornamented with pearls, probably intended to prevent the disarrangement of the ring in the nose. Besides all this, forehead, throat, arms, fingers and toes were richly loaded with ornaments. The Indian shawls, cloths and scarves richly embroidered with gold, that were exhibited close to this lady, with many other articles for the toilette, of dazzling splendour and variety, confirmed the remark that we made in the beginning.

England was represented by one London firm . . . . . which sent a good number of *faille* dresses to the Exhibition. These were all arranged with great pains, were of beautiful material, and the colours all in complete accordance with the accurate English taste, but we scarcely think that they would be particularly inviting to the taste of our continental ladies.

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Clothes and Costume for Men.

Report of Anton Kreuzig, *Master Tailor, Member of the Chamber of Commerce and of the International Jury.*

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It was much to be regretted that France and England took so small a part in this Exhibition, only one exhibitor coming forward from each country. As England especially always serves us as a model in the preparation of

practical and appropriate clothing for men, the small participation of this country was so much the more to be regretted.

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Felt, Silk, and Straw Hats.

Report of Wilhelm Pless, *Hat-maker, Vienna.*

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England was worthily represented by Christie, of London, the largest hat manufacturer in the world. The few articles exhibited were of the most excellent manufacture and of the finest quality. The firm, however, demands high prices, and Austria especially has nothing to fear from their competition. In ordinary goods it is true the manufacture is extraordinarily cheap, because machinery is in more general use. The smaller articles are made from beginning to end by machinery. The firm of Woodhams, Macqueen, & Johnson sent very good felt hats, but dear; on the other hand their woollen hats—which seem to be a speciality with them—were astonishingly cheap, being priced as low as an Austrian florin apiece!

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Straw Hats.

England was represented by Vyse & Sons with plaits of unusual beauty and most excellent needlework, finish, and design. Here also all the other celebrated firms were absent, which is the more to be regretted because it is England that has the largest trade in straw hats; the so-called real English plaits form a speciality which is distinguished by the peculiar regularity of the plait and its high brilliancy. The English hats also exhibited a peculiar needlework, quite different to that which is in use with us, and an extremely beautiful finish.

Gloves.

Report of Franz and Max Stiansy, *Glove Makers in Vienna; Members of the International Jury.*

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The important manufacture of England, which unfortunately was not represented at the Universal Exhibition, is mostly confined to strong gloves known as dogskin, for the manufacture of which sheepskin from the Cape of Good Hope is generally used. The articles produced by this manufacture are most excellent.

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Cravats and Neckties.

Report of Josef Migotti.

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In the beginning of our tour of inspection we saw in the English section the great London firms of Lloyd, Attree & Smith, Slater, Buckingham & Co., and Welch, Margetson & Co., who claimed our attention by excellent and genuine specimens. They are simple, mostly of one colour; nothing added to them but the accessories which are indispensably necessary, all ornament being avoided as much as possible. Although the London fashion of combining heavy outside studs with wadded pieces, gives to the English cravats a rather clumsy character, yet it distinguishes them with a respectable appearance and acknowledged durability.

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LEATHER.

Report of S. GOLDSCHMIDT, *Chief of the firm of* JACOB S. GOLDSCHMIDT, *Member of the Chamber of Commerce; President of the First Bohemian Leather Manufacturing Company, Prague.*

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In the examination of leather for soles, it is necessary to divide it into three groups according to the process by which it is tanned. The leather that is tanned with Hungarian galls or Valonia, by the process in general use in Austria, Italy, and Greece, cannot be put in comparison, either with that tanned in bark of oak or fir which Germany, Switzerland, Sweden, Denmark and Russia produce, or with that which is dressed with extracts, such as was exhibited by England and America, but each of these kinds must be considered separately.

We come now to our third group—of leathers dressed by extract, but the small number of English firms who are exhibitors of leather affords us no basis for instituting comparisons; two only exhibit sole leather, and of these only one (P. & E. Evans, of Bristol), exhibits it as a speciality. The tanning and the finish of sole leather exhibited by the firm we have named were excellent. As a singular production of the science of tanning must be mentioned the hippopotamus hide, which though of the thickness, rare even for this class of hides, of three inches, was thoroughly tanned throughout. The want of participation in the exhibition by the leather manufacturers of England is the more extraordinary because the trade in leather carried on between England and Austria is enormous and increases every year. With regard to the extent of the leather manufacture in England we are enabled to form an approximate idea of the importance of this branch of trade when we are told that the foreign raw hides imported by sea alone amounted to the following quantities:—In 1871, 226,402 ox and cow hides; 8,103 South America horse hides; 6,054,863 kips and buffalo hides. In 1872, 390,396 ox and cow hides; 6,231 South American horse hides, and 7,001,989 kips and buffalo hides.

In order to give a clearer idea of the enormous importance of the London market for the trade in foreign raw hides we append a statistical table of comparison of the London hide market, extracted from the annual report of Messrs. F. Schmitz and Co. of London, which shows the commercial movements of the last seven years.

Leather was exhibited by the English colonies and is all the more deserving of notice because it will not be long without a great influence on the whole of the leather manufacture of Europe.

The statistical reports that lie before us shew that the import of tanned leather into England in 1861 amounted to 5,219,000 pounds, and that in the year 1871 it had increased to 17,589,699 pounds, representing a value of 1,094,643 pounds sterling, while in 1872 it had further increased to 27,929,014 pounds, of the value of 1,795,883 pounds sterling, showing an increase on the previous year of 10,339,315 pounds, of the value of 701,240 pounds sterling. We observe that, of the quantity imported in 1871, 9,015 bales were of Australian sole leather, and in 1872 this had increased to 13,823 bales, equal to about 500,000 half skins, and we are further informed that in 1871, 248,963, and in 1872, 517,000, tanned kips were imported, chiefly from Bombay, and that at the eight public auctions that were held in London in the year 1872, 7,828,909 sheep and goat skins tanned in the East Indies were sold in addition to the usual private transactions that are made after every such sale. Taking these facts into consideration, the leathers sent by the British colonies, which for the most part were suspended to decorate the pillars of the Exhibition Building, deserve to be regarded with great interest, but it is to be regretted that a close examination of them would have been to no purpose, if only for the reason that they were exhibited without any notification of the place of their origin and manufacture. Generally, however, the English method of tanning and preparing seems to have had a predominating influence on the method of their production.

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As we have remarked above, the English leather manufacturers, who were so brilliantly represented at the Paris Exhibition, have almost altogether held aloof from that at Vienna. We only found John Dixon and Son of London, exhibiting beautiful grained, and varnished carriage leathers and tanned split hides; Newton, Gough, and Co. of Manchester, with prepared upper leathers; and John S. Deed and Sons of London. The above were the only representatives of the English manufacture of coloured leathers.

From the Cape of Good Hope the well-known energetic Austrian Consul, Mr. Adler of Elizabeth Port, sent specimens of tanned sheep's and goats' leather.

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UNTANNED AND FURRIER'S GOODS.

Report of J. MAX. HIRSCH, *of the firm of* HIRSCH and EIDAM *in Vienna.*

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England, to our regret, exhibited no finished furrier's goods. On the other hand we found here two firms whose beautifully coloured sheep and goat skins were unsurpassed. The size and abundant quantity of wool of the English sheepskins, which the English excel in converting to leather and colouring brilliantly in all shades, render them particularly well adapted for mats to lay in front of doors, beds, and tables, to which purpose they are universally applied. Still finer in colour are the goatskins, which are mostly used for passementerie (trimmings).

In the section of the English Colonies we remarked, among the exhibits from West Africa a selection of the monkeys' skins which have become an article of trade in that colony; from the Cape of Good Hope, along with a few skins less worthy of attention, some of the very finest dog-fish skins; and from Queensland a collection of skins of the opossum, which were also exhibited as finished rugs, though they were irregularly arranged. Further, one firm from Melbourne sent to the exhibition some sets of furs of natural opossum and kangaroo skins and skins of the emu, as used by ladies in the colony, the design and finish of which, compared with ordinary furrier's work, was rather primitive. A suit of feather skins of the kiwi bird, the private property of an Australian lady, was interesting on account of the skin used for its manufacture.

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ARMOUR NOT SERVICEABLE IN MODERN WARFARE.

Report of JOHANN NEWALD, *Director of the k. k. Forestry School at Mariabrunn.*

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Sporting Weapons.—Passing over to the English exhibition of weapons, we found in the collections of Alfred Lancaster, (27, South Audley Street, London), and P. Webley and Son, (Weaman Street, Birmingham), a row of beautifully worked double guns, rifles for deerstalking, and revolvers, which, while every detail of finish was carefully attended to, were conspicuous in attracting attention by the precision of their construction.

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METAL WARES.

Report of CARL HAAS, *Manufacturer of Articles in Bronze, Vienna.*

GREAT BRITAIN.

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Beyond all dispute the most important productions of art industry here were exhibited by the firm of Elkington and Company, of Birmingham. Since the date of the former Exhibitions, at which this firm earned a world-wide celebrity, their exemplary efforts have continued unchanged, and they have collected into their service with the most watchful care all and everything that was worthy of a metal art manufacture. How complete their success has been, and how great is the advantage of persistent aiming at a high goal, has been shown by the recent Exhibition. An important process of improvement has resulted from the long co-operation of one of the most celebrated living engravers, Morel Ladeuil, a Frenchman, of which the productions of the firm derive the first advantages. The conception of designs is overlooked and partly effected by the artistic manager, Mr. Willms, and although the requirements of a particularly British class of customers are studied (as, for example, in a set of plate decorated with banners, and in some vessels) we cannot withhold our full recognition of the freshness of genius and successful endeavour that pervades the whole establishment. A beautiful épergne by Morel in oxidized silver, mounted with damascened iron, displays the most eminent technical talent. The productions of this firm include a most extensive assortment of table furniture, and all articles of luxury that the bronze manufacture and the goldsmith's art produce. There were some very tasteful services exhibited, especially one with so-called Pompeian ornaments, and some remarkably fine specimens of bowls, jugs, fruit, and other dishes, for the most part elaborated with the most effective designs. Great energy and success is displayed in counteracting the tone of sameness that ordinary silversmith's work is distinguished by in consequence of the white ground colour, by oxidizing, by gilding in various colours, and by judicious introduction of enamel. In the art of enamelling the adaptation of the Oriental art in "émaux cloisonnés," so rapidly and skilfully taken up since the last exhibitions in France and England, was excellently well represented. These are kept in direct imitation of Oriental models, but in refinement of colour and careful treatment of design, they already go near to surpassing their Eastern rivals. The only suggestion that we would make is for the more energetic cultivation of decided tones of colour and diminished introduction of the fashionable colours into the circle of this noble art. The chased work in iron on an ornamental shield seems also to be managed with most excellent skill. In the wares for common use covered with galvanized silver we met with the same excellence of finish as in the furniture of genuine silver. Minute inquiries that we have made have enabled us to refute here a common opinion which prevails that Elkingtons possess the secret of a process of laying on galvanised silver in so brilliant a texture that the subsequent polishing of the work is superfluous, and nothing is required but a slight finish to the polish, to be given by the workman's hand. Up to the present time there is no English or continental process of silvering in existence that is durable and other than opaque in effect, and all has to be scratched and brushed and then polished with steel and blood-stone. The so-called bright silvering which is produced by the mixture of a few drops of sulphuret of carbon with the silvering solution is in general not to be depended upon, and very variable in appearance. Its first mention occurs in the well-known work of Smee on Galvanoplastics.

Hancocks and Company.—The rich exhibit of this firm displays gold and silver work of every variety of design and style. Along with superb objects, only possible in England, such as the so-called Tennyson vase for example, was to be seen an extensive assortment of table furniture, cans, epergnes, &c., in genuine and imitative metals. Although the whole was evidently intended in the first instance for sale, the so-called China silver ware contained much that is remarkable, especially cleverly worked vessels with brilliant and

opaque surface. But, on the whole, finer taste in the conception of the objects was desirable; the artistic tendency of the whole collection was stiffly confined to the limits of genuine English taste.

W. J. Thomas (28 Old Bond Street, London), exhibited table furniture finished with technical success, but rather insignificant in design.

Shaw and Fisher (43, Suffolk Road, Sheffield), sent good marketable wares, of sound and irreproachable workmanship, but very old fashioned.

Amongst the bronze objects those of R. W. Winfield and Company, (Cambridge Street Works, Birmingham), are to be mentioned before all others. This large establishment produces smooth and engraved pipes, of colossal dimensions, and excellent working in metal, in bedsteads, candelabras, lustres, &c. The workmanship was irreproachable, and the treatment of the metal by deadening or raising the tone of the colour with excellent varnishes was especially sucsessful.

Equally successful was a bedstead by Peyton and Peyton (Bordesley Works, Birmingham).

The solid and tastefully elaborated andiron stands, made of iron in combination with bronze, exhibited by M. Feetham and Company (9, Clifford Street, London), are essentially English. Amongst the ordinary bronze ware the works of G. Betjemann and Sons (Pentonville Road, London), deserve to be distinguished. Resembling the well known Vienna articles gilded album covers, cups, vases, in effective combination with mosaic and painted enamel. The celebrated English Britannia metal manufacture was represented by Shaw and Fisher, (43, Suffolk Road, Sheffield), and R. Broadhead & Co. (Britannia Works, Sheffield). The last-named firm especially exhibited most pleasing and very handy designs. By a very sensible contrivance the projections on such objects as cans and "rechauds" that are exposed to the action of fire when in use are protected by insertions of porcelain. The silvering of the metal was also very superior. The samples of steel and silver alloy applied to blades of knives and forks sent by John Neal (Edgware Road, London), were also interesting. The metal is said to resist the oxidation perfectly, and besides is well adapted for gilding. The tone of colour of the pyro-silver dipped alloy is a rather yellowish grey, The galvanoplastic art was worthily represented by Elkingtons and Franchi & Co. (15, Myddelton Street, Clerkenwell, London); the last-mentioned firm especially exhibited a valuable collection of reproductions of the works of ancient art, which were executed in a style deserving all praise. We would only observe that by the distinctly modern character of the brilliancy of the gilding, the texture of the surface, often worn away by use, has a bad effect on the impression produced by the whole piece, especially in objects copied from ancient originals. Elkington sent some beautiful shields and tankards and successful productions in candlesticks, &c., of electro deposit. The platinum objects exhibited by the firm Johnson, Matthey, & Co., of London, are of great importance. Unrepresented amongst ourselves the platinum manufacture is limited to England and France. Germany has also one firm in Hannau, which cultivates this speciality. The apparatus for refining silver and for sulphuric acid are of irreproachable workmanship, and we must mention especially for its technical success the soldering, which, according to the statement of the manufacturers, is prepared without gold. A bar of palladium, as a secondary product, worth 48,000 florins, gives an idea of the value and extent of the manufacture.

Colonies of England.—India.

India, although it was engaged in intimate traffic with Europe 1500 years before our era, is the only Oriental country which, by a happy conjunction of external circumstances, has preserved unchanged its primeval civilisation, so far at least as this finds expression in the artistic products of its industry. Although it may have yielded partly to Arabian influence, there is no such radical and universal change to be detected in the native character as there is in the Persians and in Mohammedan art in general, and the remarkable stability of the conditions of life in India (where the artisans reproduce, to this day, with the most primitive tools, handed down from generation to

generation, the models conceived by their ancestors, and add to their body in obedience to the prevailing spirit of caste which forbids all choice of social position), makes the work of the present, with all its elaboration, the true mirror of the technical and artistic talent of primeval times. The frequently repeated exhibitions that have been held have raised the art industry of India to a high position in our esteem, and have led to its becoming in many branches the basis of a rational regeneration of occidental taste. It must, however, be distinctly recorded, that in spite of the continuity of character of their productions, they do not confront us with a lifeless art devoted to the senseless copy of inherited originals, but the Hindoo of to-day, faithful in his own invention to the spirit of his native art, applies its principles to his works in inexhaustible variety. The time is still far distant when the community of artisans of Europe will attain the pre-eminent and truly artistic dexterity of India. The charm and the excellence of these productions result from the liberty in which they are conceived and executed. They are real emanations of the artisan's own mind, technically perfected by the experience of lifelong practice; not derived from the design of another man, however skilled, but the creation of the workman's self, in the fullest meaning of the word. Like those of most of the civilized peoples of antiquity, we find the designs from which the work is derived increasing in simplicity of external appearance in direct proportion to their antiquity. We find ornaments of a design of extreme antiquity, the simplest spangles and rings, for example, such as are discovered in ancient burying places, in common use at the present time.

As the exhibition was sent out by the Government, it was in many cases impossible to learn the maker's name, and we will therefore only attempt a short description, following in order the localities of the art workshops. The great extent to which silver is applied in ornaments and furniture, is remarkable. This metal seems in many places to be of universal application, especially in the manufacture of ornaments of a simple character. The designs consist of rings arranged in series, often in a very primitive fashion, oval and circular spangles, and some separate pieces which are suggestive of Merovingian or Carlovingian treasures, especially some armlets set with four-cornered emeralds. From the Punjaub we saw some vessels, broad in the belly and narrow in the neck, opening out funnel-shaped at the top, in various modifications of the same design, wrought in silver—the body of the flask being both chased and engraved with a great variety of ornament. Near these, also for modern uses, were the tea services with gigantic water-cans, of a peculiar clumsiness in the main features of design, but charmingly ornamented with etchings and engravings. The water-pipes (hookahs), common in this country, were made of tin, and finished with numerous designs of abundant variety; the tin was coloured black by a process allied to that of colouring with Indian ink, and covered with stars, leaves, or flowers in silver (left bright). There were also the most elegant specimens of silver filigree, in floral and globular designs. But we especially admired—together with excellently worked gold filigree—the splendid and rich gold armlets, earrings, and necklaces, in which the enamel, equalling precious stones in colour and transparency, was wonderful. The present Exhibition unfortunately contained but little of this important branch of technical art, although the Exhibition of London some years ago displayed some wonderful specimens of ornaments of gold and enamel.

From Bombay and its neighbourhood, along with the ordinary country ornaments of antiquated design, with filigree and sponge-shaped pendants, there were exhibited many vessels of silver, exquisitely chased, but of the simplest design. The ornaments of gold sent from this part of India were distinguished by the beauty of their colouring, like that of the French ormolû; and other sites of the manufacture, such as Ceylon, for example, sent fine filigree work in uncoloured pale gold. Here were to be seen the drawings in Indian ink on iron tankards and dishes, jewel caskets and vases, knives and scissors from Bedree. The beaten gold wire is introduced in beautiful ornaments, encircling the iron like a net, and this is accomplished with a freedom of treatment that dissipates all recollection of the labour the work must have cost. The cheapness of these works was astonishing. Coloured saucers were to be had at from 30 to 40 florins which could not be

manufactured in Europe for less than 300 or 400 florins. Costly specimens of coloured and incrusted work were also to be seen on ancient and modern weapons, such as axes, lance-heads, swords, daggers, and the like, and on defensive weapons and pieces of armour, such as were exhibited in the central pavillion.

From Mysore, there were vessels of silver and brass, often of extreme boldness, and of great beauty of design, covered externally with engraved and blackened ornaments. Unique in art, and worthy of all imitation, for example, was a festoon of ribbon kept square, and containing appropriate leaves in the middle of the square on a ground deadened in colour by pearl chasing, the leaves, by the contrast, glittering brightly.

From Madras there were more brazen vessels, containing inlaid ornaments of copper, the ornaments carved out and fixed with chasing. In some parts the copper appeared to have been inserted in mosaic altogether. The harmony of the effect was surprising. Silver was also inlaid upon carved pieces made of plated metal, then hammered and finally chased. Many of the utensils for domestic use in cast and hammered work, both brilliant and dull, in great variety, were less important, being rather remarkable for originality than for beauty. Scarcely one branch of the metal worker's industry was unrepresented, and in most of them the work exhibited was most excellent.

Note on the Colouring of Jewellery from Ceylon.—The colour of these jewels is not the natural colour of the gold. The Tamils being dissatisfied with its natural colour, give it an artificial one. The ingredients and the process employed for fixing the colour are the following:—After the jewel is made and completed it is heated, and then put into a solution of salt. The quantity of water used for the solution is just sufficient to cover the jewel. The gold then turns white, and is cleaned by rubbing it with soft white sand. The jewel is then put into a solution, composed of salt and alum in equal quantities, and in alum and saltpetre twice as much, and is treated till the whole solution is evaporated and slightly heated, when it assumes a yellow colour. It is then dipped in water, and cleaned with soft white sand, and again heated in the last named solution, cleaned with sand, and polished.

This colouring is further carried on as follows:—A solution of acid of Gorga fruit or tamarind, and a very slight quantity of brimstone, and what remains of the last solution, or rather its dregs, after evaporation, is heated. When the solution begins to boil, the jewel is put into it, and moved about until the desired colour is obtained.

The silver jewels also admit of colouring. The process is nearly the same as in the case of gold, but the use of brimstone is avoided, and they are principally dipped in a solution of lime.

In ancient times there were distinctions as to what jewels certain classes of people should wear, and what classes should not, and also as to town fashion and country fashion; but they are now worn indiscriminately by all classes of the people, and by the people of all districts.

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LAMPS AND ILLUMINATING APPARATUS.

Report by CARL COHN.

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England is by no means sufficiently eminent in the manufacture of lamps to contend for an export trade.

R. W. Winfield and Company (Cambridge Street Works, Birmingham), however, produce very beautiful lamps and candelabra for gas, which are used in London and exported to other towns of England. Field and Sons exhibited dark lanterns for the police, which are very solid in construction and finish. These lanterns are worn on the breast so as to leave both hands free. A small spring cover an inch thick shuts the reflector in such a manner that there is not a spark to be seen. When the cover is open these lanterns illuminate a wide space with a strong light. With equal facility and suddenness they can be darkened again. Charles Jeffreys (103, Hatton Garden, London), has some large reflector lamps which throw a strong light on separate objects

on which they are specially turned to illuminate them. They are constructed with circular prisms and metal mirrors similar to those used for the signal lamps of lighthouse towers. The arrangement is however not new, but its application to small kinds of lamps and hand lamps might be turned to great advantage. It is to be regretted that these lamps were not submitted to a trial. The brass gas chandeliers of Best and Lloyd (Cambray Works, Handsworth, Birmingham), are remarkable among the few English exhibits, they are ornamented in excellent taste and are of practical construction.

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JOINER'S WORK IN BUILDING.

Extract from Report by WILHELM FLATTICH, *Architect, &c. &c.*

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Sliding windows such as are used in England are required by reason of the thinness of the walls of dwelling houses in that country. The disadvantages of this arrangement consist in the imperfect exclusion of the cold; the unpleasant rattling of the window frame when the wind is strong; but these are remediable by perfect precision of construction and expensive iron structure.

The English exhibition contained only furniture, the principal part of which was marquetry (inlaid work).

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JOINER'S WORK IN FURNITURE.

Report by BERNHARD LUDWIG, *Manufacturer of Furniture at Vienna.*

Furniture industry has at all times taken a prominent rank in industrial exhibitions, and attracted the visitors' interest in the highest degree; it was so at this Exhibition; but here the spectator had great difficulty in forming a clear idea and judgment on the progress that has been made in this branch of industry recently. First, he was impeded by the unequal representation of several states and countries, which in proportion to their other productions, sent some too much and some too little; next by the arrangement of the Exhibition itself, and the principle adopted of grouping objects altogether with reference to their raw material, so that were was furniture in every gallery and every supplementary gallery; and finally by the thoroughly inefficient system of the catalogues.

ENGLAND.

The country that stands next to France in excellence of artistic and technical execution in the manufacture of furniture, and which in many instances surpasses France in that respect, is England. But her fame is of more recent date than that of France. It was in the first International Exhibition at London in 1851, that the English discovered that they were lagging behind in the manufacture of furniture; and it was Austrian firms;—Leistler, Groeger, and some others, who drew especial attention to this circumstance. In the Universal Exhibition at Vienna the furniture manufacture of England was divisible according to styles into two classes of tendency:—the Gothic, which may in this place be called the English, because no other country has yet begun to produce it. In this style there is generally used light-coloured wood, with gay paintings, majolicas, and so forth. Secondly, the English of late have been cultivating the Renaissance, and in design and application of technical resources come frequently into collision with the French taste; but they cultivate intarsiatura (inlaying with various kinds of wood) still more, and stand on a higher footing than the French in respect of the style of their technical art. Here and there they appeared too zealous in their pursuit of intarsiatura, converting everything possible into flat surface, in order to inlay it with a variety of materials; for example, there were capitals, scrolls, and other parts naturally plastic ornamented with very great skill and labour with intarsia;

and on the other hand there were attempts to make surfaces, which might conveniently have been filled up with intarsia, plastic by carved work; which is wrong altogether.

The most excellent objects were in the exhibition of Jackson and Graham, London, who displayed a sumptuous collection of furniture. This was constructed with the greatest technical skill, and in all conceivable kinds of wood. It included especially a small ornamental writing cabinet, which, for execution, colouring, and design, was charming. There was also a book-case of ebony, with ivory inlaid and ornamented with bright coloured stones, the lower part of which had already been exhibited at the Paris Exhibition. Several tables were particularly striking, the surfaces of which, for taste and technical execution, could be compared to small works of art. I must further notice a book-case constructed to the order and design of Owen Jones, which for design and colour, may be designated a prophetic piece of "furniture of the future." For as you looked at it you were made aware of a totally new tendency which made you actually nervous. As to the work of this piece itself, it was executed with masterly skill.

Holland and Sons, of London, exhibited a table richly inlaid with wooden marquetry and ornamented in bronze, which we had already seen in the London and Paris Exhibitions; and a book-case which might have been improved by a quieter case to its bright coloured book bindings, and by a less striking gilding. The toilette furniture of satin wood and ivory inlaid exhibited by Walker, London, was, in spite of the good elaboration of the technical part, from an artistic point of view, a failure. The ivory insertions, the engravings on which were coloured green and red, had no effect.

Collinson and Lock, of London, exhibited furniture of Old English pattern; steadfastly refusing to wander towards the taste of other countries. Their furniture consisted of fauteuils, chairs, étagères, and other objects. Morant Boyd and Blanford, of London, also sent ash furniture with faïence fittings in antique English style. Cooper and Holt, Bunhill Row, London, exhibited a sideboard in English taste, and a waiter with inlaid and painted panels, the whole colour of which produced an agreeable effect. Gillow and Company, London, sent a sideboard cupboard of pear-tree wood and ebony inlaid with tuya panels. This was tastefully designed in Old English style, the technical appliances artistically used, and the execution very true. I will further notice the chairs exhibited by Clark and Sons for their cheapness and tasteful execution.

We were surprised, on examining the pianos as to their external form and workmanship, that there was in this branch nothing at all worthy of notice exhibited by England. The same observation is made by the reporter upon musical instruments in respect of his special subject.

And now to complete our survey we will subjoin some notice of the raw materials, veneers or inlays, tools, machinery, inventions and improvements in preliminary processes of this manufacture. As to raw material, France possesses in her wild poplar a splendid "ground,"* combining all desirable qualities for furniture manufacture, and giving the French manufacture great advantages over that of other countries. For more costly work they use oak and plain mahogany. For their inlays they use, for the most part, such dark coloured woods as nut, ebony, icaranda, and mahogany. England again has direct sources of importation of woods in her colonies, and is enabled by cheapness of transport, to use the best woods, such as mahogany, nut, Swedish and American pine as "ground." But, contrary to the practice in France and Austria, we find that they prefer only light-coloured woods for superficial decoration; as oak, ash, satinwood, Hungarian ash, American olive, and so forth.

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* That is, inferior wood to cover with veneers.

PLAITED BASKET WORK.

Extract from Report by CARL KOHN, *Civil Engineer, Vienna.*

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England was represented by one single London firm, and by that very inadequately. British India on the other hand exhibited beautiful mats and baskets, and ornamentally plaited fans and baskets from Indore which were peculiarly remarkable for their curious style of ornamentation.

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EARTHENWARE.

Report of DR. EMIL ZEIRICH, *Member of the International Jury.*

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Of 492 exhibitors, there were 13 from England and 17 from India.

Turning our attention to the North of Europe, to North Germany, and England, we find the plain brick architecture firmly established there in the 13th century. It is the almost exclusive material of the English gothic. Its development was favoured by the scarcity of rocks applicable to architecture in that flat area, recovered by slow process from the ocean, as well as by the difficulty of producing a lime mortar for stucco capable of resisting the weather, and the continual corroding action of the damp salt sea air. The burnt clay has maintained its stability, and the monumental buildings of the middle ages stand as firm to this day and as unaffected by age as the comfortable dwelling-houses of the citizens.

Not less excellent [than those of Berlin] are the architectural applications of earthenware in England. England is beyond dispute the home of the earthenware manufacture; it has brought the science to perfection, and has certainly applied it also in the most universal and diversified forms.

It is there that we find ourselves in the very centre of the plain brick and tile architecture. The practical Englishman knows how to appreciate the advantages offered by this style of architecture at their full value; he perceives the cheapness and the value of the plain brick building for his dwelling-houses and factories, and he prizes the eminent adaptability of terra cotta to decorative purposes. The two largest and best known buildings in London should be mentioned here, the colossal Albert Hall and the South Kensington Museum. In America, no less than in England, the buildings are almost exclusively without stucco, and the bricks, which are there nearly always machine made, are laid with an extremely fine bond and with the most perfect precision.

England, whose terra cotta and tile industries have attained such important dimensions, and become in so many respects perfect, failed on this occasion to supply us with illustrations of the progress, by no means inconsiderable, which has been recently made.

The little terra-cotta that was exhibited by Doulton and Watts, of Lambeth, does not come up to the rank of their former achievements, as, for example, of the Amazon vase which they exhibited in London in 1871. That which they did send, however, is of good, very hard, weather-proof material, but not quite sharply moulded, and its colour is a not disagreeable yellow. With respect to the modelling, their work, like all the English productions in this kind, stood far behind that of Austria and Germany.

G. Jennings & Co., of Lambeth, the well-known firm for "sanitary" articles, exhibited some pieces of terra cotta amongst their stoneware, consisting principally of architectural memberings, capitals, and similar models. The material and the execution resembled that of the firm last mentioned.

H. Doulton and Company, of Lambeth, the sister firm of the first named, brought an interesting collection of the so-called blue metallic bricks or "iron bricks," an extremely dense material, to be classed with that of the Munich paving slabs. When the red, strongly ferruginous, refuse earth of the Staffordshire pits is properly burned in the reducing flame of the terra cotta kiln, it slags into a compact mass resembling clinkers, which is of a blue black, often dull, colour, from the protoxyde of iron on its surface. The

success of this manufacture depends on the skill of the burner, and on his special dexterity in the management of the reducing flame. It has increased very considerably in England of recent years.

Wood and Ivery, Albion Brick Works, Staffordshire, also sent some exquisite pieces of this metallic brick, and some pieces of considerable dimensions, of very interesting designs for special objects, as, for example, curbstones for railway platforms, chimneypiece decorations, ridge turrets, copings, &c. These goods, which can be applied with very good effect in plain brick architecture, supplying a simple and extremely permanent definition of outline in conjunction with other bricks, might beyond a doubt be easily produced from many of the clays of Austria, and would well repay the experiment. Let us further mention, as a speciality, the rustic terra cotta of the South Tyne Works, an imitation of stems and barks of trees, which it appears is used in the construction of various objects in a garden. The original idea was, on the whole, very well carried out; but that does not prevent us from being very doubtful of the value of such elaborations.

England exhibited scarcely anything in illustration of her important manufacture of fire-proof earthen goods. The great Scotch manufactories held aloof, and the stone of Glamorganshire was not represented at all. The great districts of Stourbridge and Newcastle, which alone produce 120 millions of fire-proof bricks, were not represented. And yet the imports of such goods into Austria from England are not inconsiderable; and especially the dinas stones, which are almost the only kind that can be used for our modern process of smelting steel.

Doulton and Watts sent specimens, made of Siberian and Austrian graphite, of their crucibles for the highest temperatures, and exhibited pieces that had been used, and had already withstood the process of steel smelting 10 or 15 times. The composition of these crucibles varies, of course, with the purpose to which they are to be applied, and is carefully studied by the manufacturers. The graphite crucible is in particular rapidly superseding all other kinds of earthenware crucibles hitherto in use, as well as those of iron. Equality of thickness in the sides, density of substance, and good conducting power, are the principal points of excellence in Doulton's crucible manufacture.

In the same respects of equal quality, although of a different composition, are the celebrated crucibles of John Hynam, of Deptford, which are peculiarly well adapted for the smelting of gold and silver.

Holland formerly produced a peculiar crockery ware, in which England followed at a later date. This was the much-prized Delft ware, on the model of which the manufacture is conducted to this day, especially in England. The raw vessel before it is baked receives a coating of clay (engobe) stirred together into a mass of the consistency of pulp. Originally this was always white, but it was afterwards, and is now, coloured. Painting was originally laid on to this surface in blue ornaments of a rather peculiar character. Geoffroy & Co., of Gien, amongst others, exhibited imitations of this kind of delft. Delft and its neighbourhood were the seat of that faïence manufacture, which was not confined to vessels of capacity, but produced good work in paving tiles, plates to cover walls, &c. The modern manufacture of delft is very much inferior to the ancient, but this district is still the centre of the celebrated and extensive manufacture of Dutch tiles.

The English manufactories are acknowledged to excel all others in the common glazed earthenware, stone wares, and majolica manufacture. Next to them in order of merit come some of the factories on the Rhine, in Luxemburg, and in France. The original foundation of the wide-spread and world-renowned earthenware industry of England was laid by the singularly excellent raw material that it possessed in the Poole clay and the clays of the counties of Staffordshire, Cornwall, and Devonshire, which with a very slight mixture of a felspathic rock called Cornish stone, produce a most beautiful material for manufacture. At the Exhibition this year none but the Staffordshire houses were represented. This county is, however, the most important district in England for the manufacture of earthenware goods. It is singular that this industry has been so enormously, and relatively, so swiftly developed precisely in that locality which is deficient in the main condition and fitness for it

namely, in that pure white earth which has to be brought, generally at great expense, from the southern counties, and is the raw material of all English porcelain and of all faïence. For in the same degree in which the cheap Staffordshire coal is convenient to the manufacturing operations, the deep-coloured clay that overlies the coal strata is unsuited to the manufacture of precisely the class of goods most commonly produced in that district. All the establishments there have an important trade, and supply the demand for England and the colonies, as well as for export. The taste for ornamental works, the productions of art industry, has found a footing with us also, and faïence of this sort, especially during the last three years, has been successfully imported to a comparatively large amount. In the year 1871 this import already amounted to a value of 250,000 florins, the import duty being on an average from five to six florins per 100 Vienna pounds weight. To indicate precisely the character of the style of these English articles is impossible. In general the faïence intended for household use, say the plates, dishes, and crockery of every description, has the same defect that the art of painting on vessels of capacity in general has to this day more or less universally to contend against in porcelain as well as in stone ware. It still always happens that the character of the material is outraged in the design, and the fashion of the decorative painting is unsuited to the form of the object, and in both cases also the practical uses of the object are disregarded.

The interval that has elapsed between the last Universal Exhibition of 1871 and this present one is too short to admit of the observation of any material changes or important tendencies in this branch of manufacture. Now, as then, the efforts of the best manufacturers are directed to the copy of old models, although often with the result that certain characteristics of form and colour are corrected into accordance with conventional art.

This sort of mania for imitation makes the exhibition of such firms as Minton's the Worcester Works, or Copelands, a gorgeous confusion of all the styles and processes of byegone periods of art, without, as we have said, the conservation in all cases of their original characteristics. This remark applies to the high class of luxury goods claiming the highest prices in England.

Another tendency adopted by all manufacturers, with only slight variation, is indicated in those faïences or majolicas which are especially intended for ornaments in universal use, such as have grown out of the Italian, Robbia, and Palissy ware, and varying now towards one and now to the other style of art, are for the most part severaly influenced by the naturalism of Palissy.

This severity has been modulated and the whole tendency of the style elevated in recent times by the influence of the east upon the English, and also upon the French, pottery manufacture. Moreover the oriental element, combined with the two modes of ornamentation named above, the Italian and ancient French modes, is essentially the leading principle of the art of all ceramic productions of the present day. This remark cannot of course be extended in application to the oriental style of design, for the east loses its authority as a model for imitation when it begins to pursue plastic art. It is a good teacher only in the science of the ornamentation of the surface. This does not imply that there are not many oriental designs adopted, especially in English earthenware. The Exhibition showed us much of them; but it showed us also with what caution and moderation these themas require to be managed. We found them especially abused in ornaments.

It is not easy to lay down general rules for the criticism of those designs, in respect of their property as ornamental objects, which are only rarely applied to certain purposes of utility. Here also it is not by rules, but by the utility of the beauty in the first place, that our judgment must be guided, in the same manner as it is, in part at least, with respect to objects of household usefulness. In fact the majolica and Palissy ware incline, technically, almost constantly towards the form of a household utensil; candelabras, bowls, and similar things are represented, but never with the intention that they should be actually used as such. The sideboard, the chimney piece, the drawing room, are their permanent places in the households for which, from the time

of antiquity, such ornaments have been invented and composed. They are to produce effect by the beauty of their colours, to be ornaments to the table and sideboard, and in citizens houses to compensate for the absence of a display of gold and silver plate. They have retained their original purpose to this day, and the expenditure of artistic industry devoted to this class of earthenware is far greater and more successful than in the production of *utensils* for actual use in the house. A thorough education of the English artists, and a course of investigating study of style, would have enormous influence in this art, and combined with the really advanced stage that it has attained, might lead to very important results. The English manufacturers are enabled to produce models of the largest dimensions in their excellent raw material, which, although very plastic, is still not injured by the action of heat in the baking; its brightness is excellently suited for glazing, to which it never presents a discordant body colour. The vitrifiable pigments, actually the same that are used upon soft porcelain, are of rare strength and brilliancy; the glass itself for the most part isomorphous in fusion is yet not always free from streaks and flaws. The pigment is laid on partly under the glazing and partly upon it.

Printing from lithographs and copper plate has been successfully attempted in great variety, especially for the production of goods required in quantities; but the use of colours in this process (in which they are always laid on underneath the glazing) is limited to that small class of objects which can withstand even this process at a high temperature. All other colours have to be painted by hand upon the glazing, over the black outlines printed underneath, and then put into the newly invented muffle furnace. The German manufacturers on the Rhine print perfectly in a rich (even too rich) assortment of colours over the glazing, producing a much more brilliant effect more simply and cheaply. The English manufacturer, with his process of printing black outlines below, and applying the colours afterwards by hand, attains by an expensive and lengthened process the same result as Kosch's plan does by one operation.

A particularly common application of the process of printing on china is the production of tiles for the decoration of walls. These goods are very largely produced in England, also in France and on the Rhine, &c.

Mintons send quite a new process of printing from metal plates, and exhibit some, but only a few, very successful attempts, illustrating especially the precision of outline to be obtained, and the possibility of covering large spaces in this way with a sufficiency of colour.

The manufacture of tiles for covering walls and pavements has increased in England to a commercial importance of which we have no idea as yet in Germany and Austria.

There is scarcely a house in London, however small and unpretending, that is entirely without ornaments of this sort, not a pantry or kitchen which is not entirely or partly covered in these beautiful, durable, and cleanly materials. The tiles produced in England now (and not a few houses of business are engaged in this manufacture) may be arranged into three classes. First, the encaustic or burned tiles are generally produced from one or several clays, coloured throughout the whole mass and worked up very finely by the dry or wet method, by arranging the thin layers of clay, variously coloured and designed, together on a substratum or middle layer of coarser but equally durable material, and binding the whole fast together. These tiles, which resist any amount of wear without damage to their design, and are extraordinarily durable, are the material of which the beautiful mosaic floors are made which are met with all over England, and which were brought to excellent use in the construction of the South Kensington Museum and the Houses of Parliament. The upper surface of these tiles is generally left unglazed. By the addition of vitreous felspath, (Cornish stone), it is contrived to add any particular thickness to the material, and the manufacture of these goods passes over into the group of stoneware; but we could not resist the desire to introduce them into our present

subject. The tiles made by the dry system are pressed by machinery; in England this is mostly done by the use of hand presses; in Germany by hydraulic power.

The English manufacturers in general have cleverly solved the difficulty of combining clays of various colours with a substratum in such a manner that no cracking or separation shall result in the baking process, and yet of leaving the tiles perfectly even and sharp at the edges and corners.

A second sort of tiles for covering surfaces, just as common as the first, but applied to other uses, are the slabs in relief (embossed tiles). These do not, it is true, always precisely maintain the characteristic of genuine majolica and Palissy ware, opaque or transparent glazing on modelled clay. Moreover the modelling is often bad. A very beautiful effect is made by those pressed plates, on which the hollow parts are darkly shaded by the confluence of extremely fluid glazings, and thus the modelling is thrown out in full effect, just as it is in the familiar China transparencies.

Finally, a third kind. The majolica tiles, properly faïences, are made by the dry or wet systems out of the whitest clay that is to be had, and painted or printed beneath or above the lead glazing. In this kind we find the most extensive variety and the most beautiful designs. Most of it is in the oriental and especially the Persian style, in which the most beautiful of all the surface decorations, namely, those of Minton, Hollins, & Co., were exhibited. These slabs have in recent years been applied in the most varied ways in the construction of ornamental furniture, especially in England and France. In the exhibits of these countries we found a whole series of examples of their application, and, in part, with very happy effect. The specimens of furniture of Cooper and Holt; Morant, Boyd, and Blandford; Jackson and Graham, and others, are noteworthy instances.

Faïence.—It is possible that our criticism of the Austrian manufactures has fallen more favourably than it would if we had commenced by a close inspection of the masterly productions of England in this material. Even the superficial arrangement of England's faïence manufactures in conjunction with its display of china has an imposing effect in the Universal Exhibition. What an abundance of the most lovely objects for study is here, which we unfortunately can only indicate with a passing notice, and not do thorough justice to! What versatility in the art, what perfection in the designs! But let us begin with the most eminent. Mintons, of Stoke-upon-Trent, in Staffordshire, have exhibited more, and that of more excellent quality, than ever before. In many respects their debût at Vienna has been a brilliant one. This is particularly true with regard to their faience art, in which they stand unrivalled. Mintons have sent none of the so-called "current" goods (goods produced in large sets or batches); they do not manufacture them at all. Their efforts are steadily directed to bringing fine art decoration into the foreground, and impressing every article of their manufacture with the stamp of individuality. The multifariousness of their technical science, the complicated nature of many of their processes of manufacture, makes the faithful repetition of one object incredibly difficult. How rapidly does one process or another become lost, at least for a time! Thus, for instance, it happened that precisely during the Exhibition time no orders could be received for the new plum-coloured ware that was so very much admired, because the manufactory was for the moment unable to reproduce similar shades of colour to those exhibited. The processes and chemical preliminaries applied to ceramic manufacture are in the highest degree delicate, and subject to the influence of accidents of a thousand kinds, which often set the most perfect theory at nought by their actual results. More charming almost than the display of china (and certainly of greater consequence from a commercial point of view), was that of Mintons' faïences and majolicas in all the wide ramifications of style which are adopted and attempted in greater or less perfection by this establishment. The ground of the Minton wares is either white (which is often of a slightly yellowish tint), or, as in a great many of their goods, coloured clays are introduced throughout the material, by the combination of which they produce the most beautiful results. We mention some very heavy pieces, varying in depth of colour from dark sienna to chocolate brown,

and the exquisite plate from the hand of Mousille with lovely naturalistic flowers and groups of birds, new body colours, boldly and freely designed, but carried out with great effect. He has succeeded less happily with the large, flat, and elongated vessels, which are decorated with excessively large foliage in a very obtrusive style. All these paintings are placed under an extremely brilliant glazing, which heightens their effect very materially. There are two beautiful pieces of important size; two modelled vases in white, ornamented with grey and gold, of very good effect. We thought two flower vases in the same brown material ornamented with Greek palmetta ornaments extraordinarily fine, and especially remarkable in a technical point of view. The ornamentation was printed by an entirely new process, steel plates being engraved and used for the purpose. It is only by this process that the evenness and fullness of colour which characterise these pieces can be obtained. The details of this process, exhibited by Mintons on this occasion for the first time, are still a manufacturing secret. But they make a very frequent use of processes, customary in England, of printing from copper plate or stone.

But the quality that distinguished the exhibition of Mintons from all others, and which, in conjunction with the exquisite modelling of almost all their productions, was the source of their principal attraction, was the beauty and richness of their selection of colours, which they show us advancing in richness and completeness with every exhibition. It would require a close study to learn to recognise thoroughly and to appreciate all the leading types of colour with which Mintons chiefly, and in part exclusively, work. Let us select some of the most prominent of them, and in so doing let us pass over the many variations on the ordinary chromatic scale of colours which have come to be almost typical more or less of the work of all English manufacturers.

First of all we are struck with the vessels in Persian blue with which this firm entered the market to some degree for the first time in the year 1871, although there were English and French manufacturers at the same time directing their efforts to a process which had been eagerly sought for long ago, and not well discovered.

From the time of antiquity we find Persia already the seat of a peculiar ceramic industry which was already working for export in the middle ages, and had a central mart for its productions in the Greek island of Rhodes. It was from thence that the china, charmingly and quietly ornamented with gay flowers upon a peculiar blue ground, came into western trade. The imitation of these wares, excited by the high prices that amateurs were disposed to give for them, was quite unsuccessful at first, and failed chiefly in the composition of the material, which consists of a peculiarly sandy and rather porous earth.

It was principally the French who came on to the track of the Persian blue. Adalbert de Beaumont and Collinot, and the brothers Deck in Paris, worked with it successfully, and a knowledge of the process ultimately reached England, where, however, it is known to but few manufacturers, who retain it still as a secret. Mintons have brought the Persian blue into fashion in England in the present day, and succeed in producing exquisitely pure manufactures. We find it used on a whole series of vessels of every description, and can only regret that this colour, which is laid upon the peculiarly composed clay in a very fluid condition, and somewhat thickly, has a bad quality of starting, which it has not yet been found possible to obviate. This fault, to the great vexation of the manufacturer, it shares with the two glazings which we shall shortly refer to. Mintons are, we hear, at present working towards the removal of this drawback.

The specimens of a yellow glaze colour (Imperial Chinese yellow) were rich in fire. This varies from lemon colour through gold to orange, and is mostly used upon smooth-shaped vessels, frequently striped with siskin green. Vessels ornamented in this manner, the beauty of which consists entirely in the peculiar splendour of their colours, look like some of those kinds of pumpkins which our country people are in the habit of hanging up for ornament before the windows of their houses.

Exceedingly interesting for colourists were the vessels covered with a deep purple blue, which had a copper-coloured lustre and a heavy design upon it. This is the plum blue (plum colour) mentioned above as Mintons' third novelty. Vessels glazed with this have a singular character of imperfectness and incompleteness; of, so to speak, a technical naïveté; but their charm lies in the splendid and almost inexplicable beauty of their coloured surface. Several vases in this kind, mostly small, are to be seen in the exhibition of this firm, and nowhere else. They recall in a lively manner the rare Sèvres pieces of antiquity.

We cannot resist calling attention again to the splendid mulberry purple already mentioned, the Mazarin blue, the so-called "bleu de roi," and Canton blue, which are applied together with the more broken tints, the dove grey, unique violet, Pompadour red, pink, sea green, Persian turquoise, majolica turquoise, and whatever their names are, partly as old-established tints, partly as fashion colours.

We were immediately arrested by a series of exquisite productions in Mintons' exhibit, consisting of two large garden vases with rams' heads, with a ground colour watery green and blue; two brown vases ornamented with white, grey, and gold; also those vases supported by storks and ornamented with excellently modelled figures of poultry. Many garden chairs and similar objects also deserve mention and praise in this place.

This establishment also sent the Sgraffito work (scratched painting), well known from 1871—four happily executed plates on a chocolate coloured body which was covered with one or two transparent coatings of different coloured earths. When the material is in a dry condition one or the other of the layers is exposed by scratching and removing the upper coating more or less deeply, as it is required, with a stylum, and its colour thus brought into effect. Then the whole design is covered with the glazing. Modest as the materials are with which the artist is here called upon to work, the effects produced by this invention are both peculiar and interesting. It is derived from the Italian renaissance and is in common use to this day among the national potters for the decoration, in an extremely unpretending style it is true, of various sorts of vessels.

Let us not forget, finally, the very beautiful service, especially plates, but also some few knick-knacks, made in cream coloured ware, and ornamentally and charmingly decorated by the skilful hand of Coleman with fugitive and sketchily drawn little *genre* illustrations and figures of animals, nor the peculiar imitation of Henri II. ware, of which Mintons set several pieces before us on this occasion. These are mostly vessels which could only be regarded as curiosities, and are among the most ungrateful labours of the potter's art. They are kept of a yellowish white in ground colour, and a kind of "intarsiatura" (inlaid wood-work) is represented upon it in coloured earths.

The craft we are now dealing with is a rare one and has been long disused, has been, so to speak, lost. There are but a few old specimens of such vessels as these ornamenting the collections of our amateurs. Nearly all the originals are in the possession of Baron Rothschild at Paris. The design of the ornamentation is stamped into the body, and the impression thus made is filled in with differently coloured substances, and so forth. By the addition of plastic ornaments, generally of great beauty and accuracy of style, representing figures, and of the transparent glazing as a surface, these pieces, which are generally made of small size only, become real gems of ceramic art. Mintons understand excellently well how to apply themselves to this ancient craft, although they cannot yet reproduce from it all the effects of which it is capable. It was only towards the end of the Exhibition that they completed their collection of Henri II. ware with the largest piece of the kind ever produced, a shield with a border, intended to hang against the wall and to support a clock and an aneroid barometer. This last contribution must be called in every respect a masterpiece. Certainly these imitations testify to the uncommon delicacy of manipulation of their producer, Charles Toft.

Mintons' tiles are for the most part made with smooth relief ornaments and adorned with all the lovely colours that the manufactory has at its disposal.

The specimens selected vary a great deal, and the Exhibition shows a number of new designs, but the style especially cultivated is the oriental.

Now, as formerly, the excellent ceramist Leon St. Arnoux is the manager and the soul of the whole of the great business, which nowhere has its equal, and in which from year to year an unmistakeable progress can be shown. The diploma of honour was awarded to the firm by the jury.

After Mintons, the English manufacturers have in our opinion sent proportionately much too little in glazed earthenware goods. How beautiful and splendidly complete in this respect was the exhibition of England in the year 1871.

Wedgwood's manufactory, of which, however, this kind of ware is not the speciality, has sent only a few pieces of the character of the Palissy ware, and has brought forward nothing particularly new. On this occasion Lessore sent his boldly thrown off but charmingly fresh little *genre* designs on cream coloured plates and dishes, which it is true are only calculated to satisfy the genuine French taste, but which testify to an extraordinary skill in the painter. Lessore, though he is incapable of producing work accurate in style, possesses a freshness and spirit in composition which could scarcely be found in a similar degree in the whole of the Exhibition. The firm has also attempted the manufacture of the Henri II. ware, but with success scarcely equal to that of Mintons. A chess board with figures was, however, very well carried out in this style. It is difficult to form a judgment of Wedgwood's exhibition, it certainly ranked among the very best of its kind; certainly, also, the art of which it gave evidence was of the same high degree as that of Mintons; and yet it did not afford us the same enjoyment in examining it. Here and there just criticism could detect the absence of a perfect combination of artistic taste and technical capability in the work. In any case the modern firm is placed at a disadvantage by the memory of the great achievements of its predecessors, which at present are certainly only approximately attained to.

George Jones of Stoke-upon-Trent, and Brown-Westhead, T. C. Moore, and Company of Hanley, the first, especially, represent completely the modern English trade goods of majolica and the so-called Palissy *genre* the manufacturers of which have for the most part exhibited nothing here. Some of the productions of the first-named firm are known to the visitors of the Exhibition of 1871, for instance, the kneeling negro boy as supporter of a round table, and others. The work was good in design and colouring, especially the two vases, ornamented with scenes from the Midsummer Night's Dream, after Gueridons. In this instance, however, and not unfrequently elsewhere, the flow of the enamel was not perfect. We desire to mention with distinction Ludovici's performances as a painter and ornamental designer, and amongst them we would especially name a vase with the figure of a girl in a sitting posture bordered by rushes, good in colouring and bold in drawing; the whole upon a light blue ground. In other paintings also, for example in the harem scene, Ludovici's talent comes forth, whilst there is a great deal besides which must be enumerated among the less successful work. The productions of G. Jones are characterised in general by a naturalism still very undisciplined.

Precisely the same remarks apply to the productions of the firm named in the second place above, which has principally exhibited china ware. One of their remarkable pieces of faïence was the large fountain, good in proportion and massive in composition. Here also we found some spirited painted panels, amongst which we remember with pleasure one of a female figure soaring aloft; but it betrayed a want of care in the painting.

John Mortlock of London is not himself a manufacturer; but his influence on the extension and elevation of ceramic industry in England is not to be undervalued, for he exercises an active and material influence by the means of his trade, especially in maintaining a demand for the finest class of goods. His cases in the Exhibition contained the productions of the best English manufacturers from Mintons downwards, many of whose undertakings owe their existence to the suggestion of Mortlock.

A. B. Daniell and Son, and Pellatt and Wood, both of London, also work as agents of English manufacturers. Their exhibitions, mostly gathered together by chance from the productions of different houses, presented a good representation of the current English ware of the present time. It will be well to mention in this place, that the prices demanded for specimens of English majolica, &c., tend to exclude these goods from the European market, or if not to exclude them, at least to retard their introduction.

It is high time that our native industry, which has an inexhaustible fund of the best adapted raw material at its disposal in our favoured fatherland, should turn its attention at last to this branch of business, certainly highly lucrative, and which could attain the same success in Germany that it does in England. We are alluding most particularly to one speciality of the English pottery market, the tiles for walls and floors, of which several if not all of the most important firms sent specimens. It was much to be regretted that Maw and Company were not among them. In this instance it was the firm of Minton, Hollins, and Company of Stoke-upon-Trent whose exhibit gave us the impression of the richest variety and the best taste. We had before us the productions of their new establishment, which works with every known kind of machinery and other apparatus, and is excellently conducted. It would lead us too far if we enter again into the details of this manufacture, which has already adapted into its own service nearly all the processes of the modern English ceramics. The influence of the east, with which Owen Jones and Redgrave have made us so perfectly familiar by their excellent publications, upon the tendency of taste in this branch is indisputable. The accurate appreciation of this style as the true model for decoration of surface space has borne the richest fruits under the cultivation of Minton, Hollins, & Co.

The Persian floral ornaments, with their grandly composed scroll work which fills up space so happily, are freely treated and already transposed into modern style. Most of the exhibited tiles, those that were printed as well as the so-called embossed and majolica tiles, must be described as an exquisite manufacture. It would unfortunately occupy more than the space allowed to this short description to characterise the individual designs more closely, or do justice to the extreme beauty of the colours, and, what is still more admirable, their complete harmony when spread over large surfaces. A beautiful effect was obtained by a set of tiles with stamped designs of figures and ornaments. The shaded parts of the drawing are sunk into the tile, and the whole is covered with a very fluid variously coloured glazing substance so plentifully that the hollows are filled up by it, whilst the elevated parts are only lightly covered; and by this means the desired effect of modelling is produced.

Another pretty decoration were the little miniature *genre* pictures charmingly designed, and multiplied by printing. Less successful, especially in composition, we thought the two stoves, of which one, certainly beautifully painted, represented scenes from the life of Aphrodite, upon large tiles; the other, intended for a sporting lodge, had figures of animals and sporting scenes fitted in framework of walnut wood.

Taken altogether the exhibition by Hollins was exceptionally satisfactory.

The tiles from Robert Minton Taylor's, of Fenton, near Stoke-upon-Trent, though less diversified, were equally good. These were arranged together over large spaces, and the singular harmony of their delicate tints was surprising. Here also were good specimens, showing great taste in choice of colours. The collection of tiles from Minton and Company, unfortunately not so complete, appeared less prominent by the side of the exhibitions of the above two specialists in this branch. These, mostly ornamented with floral designs in relief, we have alluded to already, also to Copeland's large painted tiles for the ornamentation of walls.

Simpson & Co.,—whose entire exhibition was transferred to the English Commission House, where they had also delivered a chimney piece, ornamented with majolica tiles,—were hardly represented at all by this exhibit. Knowing what this comparatively young firm is able to do in the decoration of such tiles (which will be well remembered by the visitors to the last London Exhibition), we can only regret that we had not the opportunity of seeing more of their work here.

The fairly rich collection of ware of Indian manufacture gave a better representation of a native industry. The pieces exhibited are partly the property of the Indian Museum in London, with which we have already made acquaintance in the Exhibition of 1871, and partly collected by the separate provincial committees, or sent by native manufacturers at their instigation.

Nearly all of these ornamentally modelled vessels, edged round with fine outlines in profile, bear evidence of their community of origin from the metallic art which reached such eminent development and importance in India in ancient times. From this art they derive the beautifully winged and fragile handles upon the vessels, the long narrow necks of the vases, and even the ornaments introduced by paintings here and there are significant of the same intention, which we find elaborated more perfectly in the Indian silversmiths' work. The reason that the prominent peculiarities of Indian pottery which we indicate here were not so strikingly characteristic of any of the exhibited objects, lies in no small degree in the corruption and decadence of Indian manufacture, which has indubitably spread during the last few years over the most civilised portions of the country. With a very just appreciation of the inestimable wealth that lies hidden in the national home industry of the east, the English Government has attempted to counteract this evil by the foundation of the Madras School of Arts, and by the sending out of Director Hunter, the principal part of whose mission consists in the education of the native youth in art industries. The results already obtained, thanks to the very zealous labours of the managing director, are completely satisfactory. A collection of good models has been made, native teachers have been instructed, and the works of the pupils, which are exhibited by the Madras Committee, give evidence of very great excellence. The effort to preserve relics of ancient Indian art led in the same way to the creation of models of the ornamentation of the ancient Hindoo temples, made in the same school, in terra cotta: a number of such ornaments were to be seen in the Exhibition. Besides these, beautifully ornamented Alkarazas and other vessels were exhibited. The North-west Provinces Local Committee sent a great many varieties of glazed vessels, which showed the characteristics of the Indian work very well, also some beautiful perforated gratings for windows (called *Moncharabie*), and a few pavement flags. All of these potteries, coming for the most part from the neighbourhood of Umroha, are glazed in two colours, yellow and brown, or bluish green and white. The colours are generally very brilliant, but part of them full of streaks; the modelling, however, is not so fine as it is in other Indian work. A collection of ordinary national cooking utensils, and vessels of various kinds adapted for household uses, that we shall hardly be able to understand, came from five native potteries in Scinde, Hyderabad, and Kurrachee, the celebrated pottery districts of India. They represented the merchantable goods. They are yellow glazed window gratings with white ornaments, and Persian blue, violet, and bluish green vessels, lightly and sketchily coloured. The design consists of flowers and rosettes generally arranged in symmetrical order.

The Baroda work, black vessels with inlaid silver ornament, showed most distinctly its derivation from metallic art. Here, as in the flat-shaped vessels, large flowers are the chief part of the design of the ornamentation. A similar combination of pottery and metallic ornament was exhibited in the brown black vessels sent from the Punjaub and Azimgurh, generally containing squamiform inlaid silver wire.

Stone-bottle Work.—The history of the industry in stone-bottle work may have run coupled with that of earthen pottery and faïence, but we have no knowledge of facts on the subject, those known not carrying us back in the history of this craft beyond the 14th century. It was then pursued in the same parts on the Rhine, in Belgium and Holland, but also by the potters of Nuremberg and Bohemia. It is easy to understand how the potters of old times were rarely able to surmount the difficulty of burning to the complete slagging of the whole mass. Modern times brought life into this branch of the potter's industry. The discovery of the salt glaze, which happened in the middle of the 17th century, gave a new impulse and quite a new tendency to

the whole craft. In this branch of pottery also English industry reached to an important eminence at an early date, especially in the production of salt glazed ware. But this craft attained its culminating point with the epoch-marking invention of Josiah Wedgwood, who was able to give to his material the highest degree of fineness together with a sufficient plasticity, and to adapt it to artistic purposes. Widely as his earthenware differs from those products which are dealt with in commerce under the common name of stone-bottle work, yet, regarded from a chemical point of view, his material comes under the same denomination. Wedgwood, like almost every inventor, had his forerunners in the brothers David and Philip Elers, Germans, who coming over to England with the Prince of Orange about 1688, began their work as pottery manufacturers in the districts of Staffordshire that are now so celebrated. Like the potters of Italy and Germany they were impelled by the demand to imitate the imported Chinese porcelain, and made many discoveries in the production of half smolten material resembling stone ware. By this means is to be attributed to them the first composition of that black half glazed crockery which is produced from strongly ferruginous clay, and which was afterwards refined by Wedgwood into his celebrated "Egyptian ware."

The life and works of Josiah Wedgwood, 1730 to 1795, were of infinite importance in their effect on the pottery manufacture of England, and it is with justice that his statue greets our arrival at the railway station of Stoke-upon-Trent, as that of the father of that part of the country which bears the distinguishing popular name of "the Potteries."

Wedgwood's jasper ware, in the production of which his craft culminated, consists substantially according to his own prescriptions of about six parts of heavy spar, three parts of fine white clay, one part of quartz, and a fourth part carbonate of baryta. Baked in a fierce fire this material approximates in substance to porcelain, is hard enough to exhibit a fine polish, and is peculiarly adapted for colouring with certain metallic colours in broken tints, such as Wedgwood used in blue and sea green.

After the death of Wedgwood his heirs continued the production of this speciality, and do so to the present day without competition, although the method of the process has become known since then in many quarters. This year the firm of Josiah Wedgwood and Sons exhibited a rich collection of the ware that is known by their name in the greatest variety of design, mostly white ornaments in bas-relief on a coloured ground without glazing. For the rest, the establishment has no material progress to show of recent times in this direction, for their productions are deficient in the infinite delicacy of the laying on of the colour and the refinement in modelling which especially distinguished the old Wedgwood ware. The great personal influence and touch of his own hand of the great originator in every piece of work of his manufactory cannot be fully substituted even by the best artists whom the Wedgwoods employ in the present day.

The work in Parian belonging to this category must be spoken of in much the same terms as Wedgwood's material. It is scarcely 30 years since it was introduced into England by the Mintons, Copeland, and Mountford, and the excellent properties of the material have made it a universal favourite in plastic work, although its tendency to slag very considerably in the baking gives the manufacturers some difficulty. The Parian material has an advantage over the biscuit china of a warm and diaphanous structure resembling the antique Penthelean marble, and a yellowish colour which is unrivalled in adaptation for the modelling of the nude figure. For instance, how cold and hard, though excellently modelled, are the Swedish figures in biscuit, when compared with the magnificent figures of Copeland's Parian, which appear to be animated with the breath of life. The substance of the material is porcelain clay (kaolin) very largely mixed with felspath. It slags long before biscuit would be baked and softens throughout. The difficulty under such conditions of preventing the object from distorting or falling in altogether is considerable, and calls for great experience. But among the English exhibits there were some pieces in the completion of which great difficulties must have been overcome. The warm yellowish tint of the English Parian is only a

result of burning in the oxydising flame. As the air is freely admitted in the process of baking the small quantity of iron in the clay oxydises to reddish brown oxide, whilst the reducing flame of our biscuit ovens only liberates salts of protoxide of iron, which lay the foundation of those cold greenish or bluish white colours. The introduction of the Parian material was a great service rendered by Copeland, who used it at first as a "statuary biscuit," in the most perfect manner, and at present also produces all that is best and most delicate in this material. Since his introduction of it his production, which at first was kept a trade secret, has become known on the continent, and there are many manufactories now in which Parian of greater or less excellence is produced.

It is not in the same manner, though on a similar principle (as the German), that the English manufacturers produce their so-called encaustic tiles, which are employed, like the Mettlach tiles, less for covering walls than floors. It is unfortunate that many of the eminent manufacturers of tiles have not sent anything to the Exhibition. The recent experiments in the South Kensington Museum have demonstrated the excellence of the manufactures of Mintons. On the floor of the entrance hall by the turnstiles his tiles showed not a trace of wear after they had been trodden by hundreds of thousands of visitors, they were not even polished smooth, and they surpassed the tiles of all other manufacturers in durability.

Minton, Hollins, and Company are now producing millions of encaustic tiles in their new tile manufactory at Stoke-upon-Trent, which has been working for two years. The body of the material of these tiles is Cornish and Devonshire kaolin, and a rock which contains felspath (the so-called Cornish stone). It is indisputable that the Germans are as yet far from having attained the precision of their workmanship or the neatness of their designs. Whilst in Germany hydraulic presses are applied for the compression of the moist powdery substance, the English factories use nothing but screw presses for this purpose, like those which stood in the machinery hall at the Exhibition. The clays used are mostly yellowish white and reddish brown in colour, but there were many other colours to be seen on the tiles exhibited, which all of them have had to fulfill the condition of resistance to a high degree of heat. Good effects are obtained when the tiles laid down in this way are covered with a glazing, which heightens the brilliancy of the rather dull colour of the earth.

Robert Minton Taylor is also a specialist for the production of these inlaid tiles. Both firms produce, besides these, the well-known majolica tiles, which are to be mentioned in another place. Let us here only notice further their mosaic cubes, which are pressed in the same way as the encaustic tiles on small screw presses out of a material nearly dried to dust, and are then immediately burned in sagger. These mosaic cubes are the materials for the so called permanent fresco, one of the most considerable works in which is to be seen in the great frieze of the Albert Hall in London. It was the peculiar merit of Herbert Minton that he brought into use and to perfection Prosser's process. It is only by Prosser's method of pressing the earths upon dry earth that their shrinking, which every tile must undergo in the drying, is overcome, and the possibility obtained of working in a very fat plastic clay. In the way indicated, tiles can be produced which even look as if they had been sharpened one against the other, which are sharp cornered and completely smooth (which is the principal consideration), equal in size and of absolute precision. Naturally the expensive preparation of the clay and the care bestowed on its manufacture raises the price of the article produced. The glazed encaustic tiles soon began to be the object of imitation. The earthen tile is printed with the design, and glazed. To make the deception more complete the sides of the tile also are treated with colour in such a manner that it appears as if the thickness of the inlaid coloured clay could be seen. Such tiles, which naturally can only be used for covering walls or the jardinières so much liked in England, were also to be seen in the Exhibition.

England is at present the greatest consumer of stone-bottle ware. Establishments arranged on a magnificent scale are either solely occupied in the manufacture of these goods, or combine it with that of fire-proof stones.

In England, moreover, the æsthetical features of the stone-bottle ware industry were developed, and many a perfectly modelled vase or bowl or similar vessel appeared in the exhibition of Doulton and Watts of Lambeth, who are indisputably the leading firm for the production of stone-bottle ware. Their large factories are almost in every part remarkably arranged, and the mechanical working of the clay in the lathe, &c., is carried on in a most extensive degree. The principal force of the manufacture is in the production of vessels with a salt glaze for chemical purposes, conduit pipes for watering and irrigation, cesspipes, and so forth. Pipes of large diameter are excellently worked, kept beautifully circular, and with socket and nozzle kneaded on in the manufacture and not added afterwards, for which machinery in great variety is used in England. That used by Doulton stamps the nozzle first and then the pipe immediately. Doulton's pumps for acids, with valves of clay and piston-packing of asbestos, are the most excellent of their kind and have met a very urgent requirement. Doulton obtained a great trade and demand for his Bristol ware, which, in substance, is made of a stone-bottle material finely worked, and covered, by dipping after it is dry, with a glazing containing some amount of lead, and often of very varied composition. In this process it is possible, by partial plunging in glazing substances coloured lighter or darker, to obtain very warm tints of colour. The ware is baked at the same temperature as salt glazed, but the fire must not be admitted to actual contact with the objects. Zeal and energy in perpetually finding out new applications for his excellent material are unmistakeable in Doulton. Of less importance as objects of trade, but at the same time not devoid of a peculiar beauty, are the ornamental pieces that Doulton produces, such as vessels, jugs, &c. The material is from its nature not well adapted for fine modelling, the figures in particular on these vessels might be better finished. The ornaments carved in, and the blue and brown tints lightly laid on under the salt glaze, had a very pretty effect. Some tiles in relief, intended as ornaments for the finishing of furniture, cabinets, and so forth, were very good and warm in colour. The use of earthenware for ornament in the manufacture of furniture is making visible progress in England.

Another kind of stone-bottle ware is the so-called claret ware, which substantially is made by the introduction of colours into the material itself. The colouring, which is required to resist the enormous heat of the stoneware kiln, as well as the agency of the vapours of salt, is slight. Nearly all colours change in the process of manufacture. Brown and grey green are easy to obtain and effective. Doulton took up this manufacture only a few years since, and he exhibited some very beautiful pieces.

A similar manufacture, but not brought to such perfection in its different branches, is exhibited by H. Doulton and Company, also of Lambeth. This is really clinkers, partly unglazed, burned to a great hardness, and, from the abundance of iron in their composition, slagging very strongly. They are worked up into paving stones like those of Munich, conduit pipes, and so forth. This is the so-called "terra metallica," or blue Staffordshire ware, which has of recent years obtained a footing for a great variety of uses in the English building industry. Wood and Ivery of Staffordshire work in the same way. We have had occasion to mention them already in treating of the brick and terra cotta manufacture. These goods, like the Munich paving tiles already mentioned, which are produced in a similar mode in masses from a clay containing a great deal of iron, which slags freely, are the transition stage from stone-bottle ware to clinkers, and from clinkers to the unslagged brick and terra cotta materials.

Porcelain.—(In 1870) England turned to her own profit the temporary collapse of the Sèvres manufactory, and gladly received the best forces of the establishment. Thus it came about that we saw St. Arnoux, Lessore, Moussile, and other artists of the first rank working for Mintons in 1871. Bottcher's invention, however, is not used in England, where they have as the elementary material the soft china, which, independent of the hard china, and quite different to it in composition, was known in Italy about 1581, and brought over to Fulham by a certain Dr. Dwight about 1671. The desire of imitating

the imported Chinese produce led to the discovery of the soft china a long time before that of the hard.

The durability of the soft China is less, the glazing and ornament are less durable, but the facility and relative cheapness of its manufacture have secured it a firm footing, especially in England. The ancient Sèvres manufactory, originally established at St. Cloud about 1695, worked in soft china up to the introduction of the invention of Bottcher, from which date the use of the soft material disappears. Dr. John Dwight established the first manufactory of soft porcelain at Fulham in 1671, the manufactories at Bow and Chelsea followed rather tardily about 1730; but the greatest extension of the English manufacture of porcelain dates from the discovery of the deposit of kaolin in Cornwall, about 1755, by William Cookworthy, the founder of the Bristol manufactories, which continued for a long time at the head of this industry.

Let us begin our review of the abundant material before us. There is the Worcester Company again with their imitations of terra cotta in porcelain. If it be sometimes blameable to assign to a less precious material in a manufacture the rôle of a fine material for which it lacks the necessary characteristics, it is bitterly to be lamented, when men permit themselves to be seduced into disguising the good qualities of the porcelain, and setting this beautiful material to play the part of ordinary burned clay or terra cotta. Reflection on the difficulties surmounted in the laying of the dull extremely uniform brown coating over the flesh parts does not compensate for this, and the really remarkably good modelling of the pieces only excites regret that the charm of appropriate material is absent from the beautifully executed form.

A process of ornamentation which has become very popular of late, especially in England, and which admits of the production of the most beautiful effects, is the "pâte-sur-pâte" surface, originally a Chinese invention, but subsequently, at a remote date, successfully imitated at Sèvres, and brought over to Minton's manufactory after the cessation of the Sèvres factory by the modeller Salon in the year 1871. Upon a ground of a dull colour plastic ornaments or figures are added (after the preparation of the article in a raw unbaked condition), in such a manner that the colourless material is obtained as a solution in water, and laid on in thin coatings with a brush upon a surface enamelled in colours. The ornament thus added is melted away in the burning, and, if the coatings have not been laid on too thickly, the light falling on the design will bring out the thicker parts in light, and the thinner—where the colour of the ground shines through—in shade.

Another speciality, but little practised, is the manufacture of the "pâte changeante," also a French invention, which Mintons, imitating everything, transferred to England. The material, which is of a greyish colour in the light, becomes a splendid purple red by candlelight. Two beautiful candelabras and a service of Sèvres in the Exhibition show this surprising effect to the best advantage. Of course no artistic or decorative value can be attributed to such processes, highly interesting as they are from a technical point of view. The success of the works in Parian material is pleasing. This has established for itself the reputation of an excellent material for plastic works, especially in England, where the English manufacturers vie with each other in discovering technical processes of the greatest possible variety. * * We will only mention the biscuit figures of the manufacturers, Gustavsberg, Meissin, Copeland, and a few from France and Germany, whose knick-knacks are often modelled with great skill in biscuit of a dull colour.

From England, Minton and Company, of Stoke-upon-Trent, send, as usual, the most, the best, and the most interesting specimens. One is induced to believe that nothing is beyond the attainment of this manufactory, for all its productions are carried out in actual perfection, and the management with which the firm attracts to itself the best artistic talent, selects its models, and collects them from all countries, deserves to be fully recognised. The technical manager is still Mr. St. Arnoux. Solon's name has been already mentioned as the master in the "pâte-sur-pâte" speciality. Boullemier

with his own surprising boldness of style, and a great appreciation of colour, cultivates *genre* and the figure parts of the ornamentation. A service of plates with charming figures of children in the bottom, painted with powder of Cassius of a really singular and seldom attained brilliancy of colour, is of his workmanship. Mousille works only as a painter of plants and animals, but with surprising effectiveness. Henk and Longmore are modellers of great value to the establishment. Let us mention further the excellent productions of the portrait painter A. Green, and the landscapes of Mitchel. Beautiful specimens were sent from the South Kensington School for painting (Marks), in small pictures on porcelain representing the seven ages of Shakspeare, executed with astonishing beauty and precision and in colours exquisitely harmonised.

Minton's exhibition of "pâte-sur-pâte" is singularly charming. Two flat gourd bottles with two beautiful figures of children in relief on a brown back ground are masterpieces, the similarly designed duplicates of which were universally admired two years ago. A principal feature of the progress that has been made by Mintons consists in the scope that they have given to the "pâte-sur-pâte" process in their establishment. A series of vessels was exhibited, beautiful in form and charmingly ornamented, generally with figures in an attitude of flying through the air, whose undulating draperies afforded an opportunity for the display of all the beauties of this subtle art. The olive green obscure background that Minton now gives to most of his vessels is perfectly adapted to bring into effect the soft texture of the pâte. How much more rigidly—though the execution of it is not less perfect—white stands out on the blue ground of the oblong casket, the finely executed groups of figures on which, nevertheless, surpass all others. Finally, the dark deep carnation on some of the works in "pâte-sur-pâte" is also to be noticed as a novelty.

The small vessels are important, prepared after Japanese models, with figures and conventional ornaments, in different colours and modelled with porcelain clay, coloured throughout upon the originally white body of the vessel. In material of two kinds of colour there are also the candelabra, having as supporters female figures, whose bodies are white and their draperies sea green. The glazing deteriorates from both of them. In these the material, which is an invention of Leason, the preparer of material for Mintons in Stoke, resembles that of Parian in its composition.

Mintons make use of printing rather frequently, especially for their faïences, and also in the ornamentation of porcelain; but generally so that the lines taken from the lithographic stone are printed in black upon the biscuit, then baked and glazed, and afterwards the surface is painted with vitrifiable pigment. In consequence of the softness of the glazing and the fluidity of the colours used the upper coating sinks in the baking, so that the effect of the decoration is not marred by the process described. A. Reynholds is the manager of the extensive printing department of the establishment, and he is also the inventor of that new process of printing from metal plates which we have mentioned already in the course of our remarks upon Mintons' faïences.

The largest specimen displayed in Mintons' exhibition of porcelain—it is the principal object of the central group of their exhibit—is a vase which is remarkable on account of the technical difficulties that have been overcome in its manufacture, although pieces incomparably more difficult of production, and still larger, in hard porcelain, are exhibited from the factories of Berlin and Meissen. We should wish to make mention also of two small vases decorated with Limoges painting, which although they are inferior in refinement to the remarkable specimens from Worcester, are we think painted by the same artist as the latter. Mintons at present cultivate this style very seldom. A speciality of this firm which they have introduced widely into use is their Turkish blue, a colour of such a delicate tenderness and purity of tone as is seldom seen. This colour, however, can only be applied on soft porcelain, every attempt to bake it into hard must from its nature fail. They have been working with this colour since 1870. The firm send only a very few specimens of its use, and those only in part successful ones. It was better represented at London in 1871, when it excited as much admiration as their Persian blue on faïence. The Turkish blue was originally taken from the Chinese cloisonnés,

and Mintons send to this year's Exhibition two large vases of this description. In general the whole of the vessel is covered with blue, then baked, and after this coloured and designed with white or other colours. The effect is most excellent, and far superior to that of the Pompadour red which is applied in a similar manner, and is also one of their finest colours. Such a delicate milky rose red as that shown in the two small vases in the Exhibition is hardly to be found elsewhere.

Finally, a method of gilding porcelain deserves to be noticed, which may come to be of important advantage in the manufacture of useful articles when the technical process has been so improved that it can be produced in a cheaper manner than at present. To make the gilding more durable—at present it is well known how easily it is washed off the glazed material on which it is only superficially laid—the glazing is eaten off from the places that are to be gilded with hydrofluoric acid, and in this way a firm basis is prepared for the gilding on which it holds securely. But new effects also are obtained from this process, by gilding over the corroded surface, and then polishing, so that the gold lying deeper in the corroded part is deadened in brilliancy.

Finally, the general impression that Mintons' exhibition makes is very admirable. Apart from the multifariousness of the technical processes which they, indefatigably striving after novelty, domicile and promote, the art with which these processes are applied is clever in the extreme. We have already noticed the eminent artistic forces that they have at their disposal, but we are able to add that they are perpetually collecting and procuring models and designs from all parts of the world. Few of their productions it is true are irreproachable in style, but they all convey the pleasant impression of a naturalism confined within accurate æsthetical limits, which Moussille is perhaps the most apt to exceed in his paintings. Trivialty and entire want of appreciation are, however, never to detected in these productions.

Mintons principally and then the Worcester Company are steadily discarding more and more the French influence which, so powerfully exercised by Sévres, has been since the days of George IV., when the Sèvres porcelain was first introduced into England and appreciated according to its merits, until the most recent times, the arbiter of the tendency of style. We have several times already called attention to the greater degree of independence with which the English artists have assumed a tendency of their own in the process of ornamentation. What we said of the colour is equally true of the form, which appears generally original, not always commendable, but never as a senseless imitation. This desire of emancipation, materially supported by the character of the English people, and their undeniable preference for that which is extraordinary and "bizarre," must at times, it is self-evident, lead to uncertainty and error. This is the only explanation to be found for the unlovely angular imitations of the forms of some Japanese and Chinese vessels and knick-knacks by Mintons, but still more by the Worcester Manufactory, upon which, however, an amount of industry appears to have been expended which was really worthy of a better cause.

But let us turn to the richly supplied glass case of the last-named manufactory. The Royal Porcelain works at Worcester, one of the oldest of English establishments, was founded by Dr. Wall about 1751, therefore before the time of Wedgwood. Under the management of Mr. Binns, the artistic manager, they exhibited a most diversified series of works, in which as an aggregate we were immediately impressed by their excellence in design and fine execution in modelling. Two large vases, the last works of the highly esteemed artist Bott of England (now deceased), one of which we saw at the London Exhibition of 1871, are remarkable achievements in the Limoges painting which was so celebrated in France in the 15th century; white painting on a deep dark blue enamelled ground. The subjects of the figures forming friezes round the belly of the vase are taken from ancient English history and represent battle scenes of the time of the Norman invasion. They are executed with peculiar refinement and precision in gray-picture. The cartoons of these friezes are by Maclise.

The Japanese vessels, which have been independently and thoroughly well composed in great number in the style of their original, are to be noted for the

dull glazed Parian material, which resembles ivory, and is remarkable, if not particularly beautiful. We cannot give our adhesion to the whole Chinese style of porcelain, and would have much preferred to see so much talent and skill applied to the production of more pleasing artistic and valuable designs; but that must not prevent us from giving our tribute of admiration to the extreme exactitude of technical skill with which these objects have been executed. The material used for the body of the vessels regarded on its own merits is a good composition of Hadley's, an extremely fascinating warm material which produces all the effect of the finest old ivory. Apart from our objections to the whole style we consider the modelling to be excellent, and especially admirable in those parts where the vessel is made with double walls, of which the outer wall is perforated in the most ornamental manner, producing the impression of ivory carving. The special object of these double walls is to provide a hold upon the vessel for the hand even when it is filled with a very hot liquid. The difficulty of producing such delicate specimens of modelling in unburned and therefore very fragile porcelain is surprising, and was conquered for the first time at Sèvres in the time of Louis Philippe, when vessels similar to these were first produced as imitations of oriental work. We now find similar work displayed by several exhibitors, as for example by Fischer of Herend, who took this old Sèvres work partly for his model.

We have already spoken of the error of setting porcelain to play the part of terra cotta. We also consider the blue glaze colour used in the process to be badly adapted for the brown of the flesh; but in this work also the greatest praise is due to the excellent modelling of the figures. We think the whole *genre*, with its gloomy *tout ensemble*, can have found but few admirers in the Exhibition.

Amongst the large quantity that the Worcester Company sent to show the high talent of their operative staff one object struck us as particularly fine—a delicately modelled small coffee service decorated very effectively with turquoises on chased gold. Beautiful as is the effect of these pieces it is not appropriate to porcelain to imitate to a certain extent the art of the goldsmith for the purposes of a vessel of the description referred to, and a mode of decoration excluding all practical utility in advance is particularly undesirable. These species of jewel porcelain, however, are important as specimens of accurate technical workmanship. The whole service was bought by the Earl of Dudley for a very high price. The exhibition was completed by a series of pieces very well executed, and especially successful in their paintings, *e.g.*, vases, cups, and other objects generally intended for ornamental purposes. The richly ornamented services of porcelain plates, and so forth, showed evidence of the influence of the admirable artistic management of Mr. Binns, who has succeeded in assembling a body of assistants extremely well trained. Let us here mention by name Bejot for the Japanese style, Callowhite as animal and flower painter, Rushton for figures, and the list of these eminent artists could still be further extended. All that this Worcester manufactory sent to the Exhibition on this occasion gave evidence of peculiar industry, and a careful and well-considered selection of subjects. If the desired end was not in all cases attained the blame is chiefly attributable to the necessity of perpetually bringing forward novelties, and of gratifying the predominant tendency of taste, having regard to every fashion which may prevail for a time among the London public.

As the third party to the confederation among the most eminent English firms we must name Copeland and Sons, of Stoke-upon-Trent. In all the productions of this firm we have to recognise the effort to obtain the most excellent modelling. We have repeatedly attempted in another place to do justice to their unsurpassed achievements with the Parian material, and will only mention here in addition that their biscuit porcelain also show the same excellence in design. Confidence in the treatment of figures is, however, made an occasion for their too frequent introduction as subject of the ornamentation of vessels, jardinières, lamp vases, and so forth, executed for the most part after the drawings and models of Abraham. The colours that Copelands put on their porcelain are peculiarly fine, and if their shades are

not always as well combined as those of Mintons, yet they are always clear in tone, and exquisitely beautiful and uniform in application. The coloured ornament in Copeland's works, when it is not required to cover large surfaces, is substantially limited to flower painting. Hurten is one of the best painters in this *genre*. Finally, the moderation exercised in the application of gilding is laudable. It is fairly free from those faults which we had occasion to blame as of too frequent appearance. Müller, the manager of the works in gilding, is gifted with a refined appreciation of the use of this ornament, which is so useful for porcelain. Besides ornamental objects, Copelands send a rich selection of very beautifully worked coffee, tea, and dinner services, which are interesting for the remarkable fineness and delicacy of the porcelain, although in respect of their artistic treatment they exhibit no work of importance. There are also some porcelain tiles, amongst which a panel with bouquets of flowers on a sea-green ground should be especially mentioned. And generally it appears that Copelands' floral ornaments are meritorious, whilst all their other painting, especially of figures, is somewhat weak. The whole exhibition of Copelands produces an inviting and elegant effect, and affords pleasure without challenging to criticism by the cultivation of any eccentricities of tendency. An independent pioneering line of conduct, such as we remark with Mintons or the Worcester Company, is not Copelands' aim; but they are ever ready to take advantage of any improvements which the progress of technical science may bring to light.

A good general view of the achievements of the three firms that we have just mentioned was afforded by the exhibition of John Mortlock, who, being himself only a dealer, has done no immaterial service in advancing the English earthenware industry, by his activity in providing the most extensive market, especially for the better and artistically finished class of work. Many a suggestion for novelty and higher perfection has emanated from him, and he has thus been doubly useful to the firms whom he represents. His glasses showed us a selected assortment of the best of the productions that we have alluded to above, both in porcelain and faïence. Indeed it may be said that whatever passes into his hands from the manufacturers' is always of the newest and the best.

Another direction is taken up by A. B. Daniell and Son, who deal more in current ware, and especially in Coalport-porcelain, the ancient reputation of which is still maintained. The manufacture of this porcelain has existed at Broseley, in Shropshire, since 1751, and as far back as 1772 Thomas Turner brought from the Worcester Works, which were then already celebrated, the art of imitating old China porcelain by deep blue printing. Rose, the founder of the Coalport process, was a pupil of Turner. He founded the Jackfield pottery, and afterwards combined the two, and enlarged them by bringing in the Swansea works. A John Rose is to this day the owner of the Coalport factories, and is highly esteemed as a manufacturer and ceramist. His porcelain is excellent, nearly all intended for household use as current wares. The relatively small quantity that Daniell sent is not sufficient to afford a perfect illustration of the achievements of this important business. We were struck by a peculiarly ornamented suite of tea and coffee services, which show an Indian shawl pattern painted by hand, with much trouble and carefulness in the execution. We need not add after all that has been said above that this style of decoration does not accord with our ideas of ceramic ornament. Nor could we reconcile ourselves to the idea of drinking tea from the calices of flowers, however natural their design and colour might be. Here we bring forward two of the most apparent errors of the Coalport manufacture, in order that we may express a hope that they may adopt more and more a decoration in accordance with the laws of style, which in this case is of the more consequence since these productions penetrate, by their cheapness, widely among all classes of the population, where good taste is as far from finding a refuge as amongst us at home.

SMALL WARE AND FANCY GOODS.

Report by LUDWIG HARTMANN.

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Umbrellas were exhibited by England, Germany, and Vienna; parasols by England and Vienna. The parasols of Vienna were distinguished by good taste. The exhibition of whips was contributed by England, Germany, Austria, and Hungary. The English work is the best, but dear.

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FANCY GOODS OF BRONZE AND LEATHER, AND WALLETMAKERS' WARE.

Report by J. WEIDMANN, *Manufacturer of such goods, Vienna.*

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England, or rather Birmingham (with the exception of the world-renowned firm, Elkington & Co., who were ranged in Group VII., for their large and valuable contribution of work and ornament in the precious metals), was only represented in bronze manufactures by lamps, &c. The same was the case with the bronzes from the German Empire, among which our attention was claimed by the many articles for illuminating purposes in the exhibit of Ravené and Süssmann. This circumstance, the similarity of construction, and the rivalry everywhere evident between the manufacturers of Birmingham and the joint stock companies of Berlin determine us to introduce under one heading our observations respecting both, and to do so before we enter upon the subject of the works of the German empire in bronze other than lamps, &c. The first peculiarity that we noticed in the numerous chandeliers exhibited by both nations was, that they were almost universally constructed for gas, and it would seem that gas in those countries must also be very commonly burned in family rooms, because the chandeliers were generally balanced by weights, varying in number from three to eight, according to the number of arms and construction of the chandelier. By the help of these the light could be brought down for more convenient use at the family work table or reading desk. Now, although these weights complicate the artistic problem to be solved in design, by coming just at that place where the rest of the apparatus is most slender, and by the changeableness of their positions, it must be allowed, on the other hand, that the arrangement of the ordinary socket lamps was still more unsightly, and that the management and illuminating effect of a moveable gas chandelier have great advantages over those of one for candles. When we get cheap gas, and more general introduction of it into our houses, the above construction is certainly that which will be generally selected, and it may then be managed to master the artistic part of the problem still more perfectly. In the artistic point of view we detected French influence undeniably active and predominant both in the Birmingham and German chandeliers. This is the more remarkable because the English have abandoned their mediæval tendency which produced very beautiful results, especially in the metal industry; and the Berlin manufacturers have abandoned their severe antiquating tendency; and both have now adopted a *baroc* style in their wares, no doubt with the principal object of increasing the mercantile value of these bronze articles with a view to the extensive export trade. With respect to technical execution such as casting, chasing, gilding, colouring, &c., the Birmingham goods in general are of a higher class than those of the German empire. This is especially the case with the lovely and originally conceived chandeliers of Ratcliff and Tyler (76, New John-street, Aston-road, Birmingham), worked out in the purest style, and most successful in choice of material, construction, and treatment. They appear to be almost the only representatives of the particularly English class of metal wares, often treated in many colours, which finds less appreciation and demand in other countries, where the Renaissance style is steadily gaining ground.

The richest exhibit was that of the important firm of Winfield and Company, (Cambridge Street works, Birmingham), containing chandeliers as excellent in contrivance as in elaboration. We wish at the same time to record our appreciation of their many works in bronze tubing, such as bedsteads, fauteuils, &c. C. J. Phillp (Birmingham); W. Blews and Sons, (New Bartholomew Street, Birmingham), Best and Lloyd (Cambray Works, Handsworth, Birmingham), and Partridge & Co. (Lombard Street, Birmingham, were represented by a great number of bronze chandeliers, many of them very rich, and most of them in technical respects excellently constructed works.

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CHILDREN'S TOYS.

Report by DR. CARL TH. RICHTER, *Professor of Political Science at the University of Prague.*

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"How England maintains her character even in the toys that she makes, "producing for the most part not playthings, but play in the most serious "sense of the word!" Only one exhibitor came from London, and he describes his exhibition in the serious words quoted above. England at the same time has an eye to trade and commercial arrangements in the first place, or to the exercise of the senses and the bodily strength, and in this way has transposed, with the happiest effect, the educational maxim of Fröbel, so much misunderstood by us, "make learning play," and makes play learning, as it ought to be. In France, represented by a brilliant display, we seldom see this idea of "learning in play," of education at the threshold of life, taken account of.

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PAPER MANUFACTURE.

Report by EMIL TWERDY, *Paper Manufacturer, Bielitz.*

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Raw materials.—The most important and valuable raw material for paper manufacture is still cotton and linen fibre in the form of rags, an article which it has long been impossible to procure in sufficient quantity, and the quality of which has not improved of recent years. Unlike most other raw materials of manufacture which, carefully treated or cultivated, admit of improvement, rags obstinately resist the influence of the demand for consumption, being brought to their last important stage exclusively in the shape of refuse useful for no other purpose. From the mode of their collection they come in mixed confusion into the trader's hands, and his sorting and classifying is not so complete as to spare the paper-maker great pains in order to be able to depend on the results of his process of manufacture. The molecular variation even of assorted goods is so considerable that manufacturers of the better kinds of paper are compelled to institute a process of resorting, and nearly all well conducted commercial establishments are accustomed to settle the value of the raw material they buy by standard prices, arranged according to the quality of various sorts, by which alone they are enabled to escape disappointment and damage, and find a legitimate settled basis for their calculations. The natural inequalities of the different materials spun, greater or less cleanness and softness, variation of colour, &c. interfere so considerably with the homogeneousness even of one particular kind, that the manufacturer, with all his care, can seldom calculate on perfect equality of material produced. This is now so important, when consumers of paper are, with right, more fastidious, that the process of manufacture demands the most complicated contrivances to keep the appearance and quality of the paper uniform, even when the raw material is apparently so. Factories that possess only one paper machine are hindered from the practice

of producing one speciality, or driven to job in their raw material. Another drawback to the rag trade is that it is chiefly in winter that there happens an accumulation of the material, and this time of the year is unfavourable to its object; when many hands discharged from agricultural labour are available for rag collecting the material comes to market damp and thus doubly impure, and the uncertainty both of demand and supply compels the manufacturer to keep large stores, &c., &c. All the above-mentioned drawbacks to the trade in rags compel search for a fibre of equal value for manufacturing paper. This search has been actively pursued for years, and since the date of the last universal Exhibition, with some success; but the great problem is not yet thoroughly solved. Among the most important of the substitutes for rags are:—wood shavings, straw, and, most recently, cellular textures, *i.e.* wood stuff prepared by chemical process. In the Exhibition there were further exhibited, potato-stalks, stinging-nettles, bark of the mulberry tree, and hemp, which are of less importance. There were no animal fibres, and minerals were only used as supplement to increase the quantity and weight of the paper.

Wood shavings.—The production and use of this substitute has taken large dimensions and grown, since 1867, into an independent flourishing branch of manufacture, undergoing no material changes of principle in the meantime, but numerous valuable improvements of detail. Since G. Keller conceived the ingenious idea and Henry Volter of Heidenheim gave it practical value by adaptation of apparatus, hundreds of manufactories of wood stuffs have been erected, as the use of the stuff became more and more evident, and the demand for it grew from year to year. Thus, for example, Germany requiring 7,000,000 of centners of rags for her paper manufacture produces only 2,000,000. The deficiency is made good to a small extent by importation of rags, but chiefly by the use of substitutes, of which wood stuff is the most important. (Here follows a description of the process of manufacture.) We close this branch of our subject with expression of our conviction that this raw material for the manufacture of paper, on account of the simplicity of the process of its preparation, its abundance, and its cheapness, will maintain a constant importance among substitutes for rags. The objection that it is only useful for the manufacture of inferior sorts of paper is irrefutable, but it is, nevertheless, the only substitute for rags from which these sorts of paper, now so important to our social economy, can be cheaply produced. We remind our readers of the newspaper and book paper, the cheapness of which contributes so much to the accessibility of important publications.

Straw.—The ripened stalks of cereals contain, besides the parallel fibres of which they consist, principally the so-called "extractive principle" and a substance of the nature of wax or resin. When the straw is boiled down with alkaline salts, these foreign substances are liberated and the halms appear then easily divisible into pliable fine fibres, after which they are suited to the manufacture of paper. Straw paper is actually made of many kinds, partly with and partly without the addition of rags; very thin and fine straw paper being very transparent is useful for copying paper, but in durability is inferior to that manufactured from flax. Straw paper and paper made from rags differ materially in texture and other properties from each other. When the fibres of straw have been reduced in the mill to the required condition for manufacture into paper, they appear through the microscope thin, short, and smooth; but the linen fibres are thicker, longer, and flocky. Linen produces a soft paper, not easily broken, easily torn by tension, making little of a sound, fibrous in seams; whilst straw paper, which, moreover, is of a bright yellow or brownish yellow colour, is firm, stiff, hard, and resonant, but easily breaks when folded and shows no fibre at the torn seams. Rag paper, when it has not been sized is more or less spongy, imbibing moisture; but straw paper is close in texture so that it can be fairly well written on without sizing. Inferior sorts of paper can therefore be manufactured without difficulty from straw alone, and their resistance to breakage is considerably increased by the addition of a proportion of rags. The straw is cut up by a machine into small pieces of 5 to 10 millimetres in length, and the hard knots are brushed away on a grain cleaning machine. The further process consists in boiling for several hours

with steam and a caustic lye (to 100 lbs. of straw, 30 to 50 of freshly slacked lime, and 1 or 2 lbs. potash). The further process of conversion into coherent stuff and finally the preparation of the paper resembles, generally, that used for rags. One hundred pounds of straw produce 60 to 70 lbs. paper. Rye straw is the hardest, then wheaten, then barley, finally oats. When rags and straw are mixed each is half manufactured separately, and they are then put together and finished in the mill.

Here a description of the various systems of manufacture. That of Hector J. Labousse, of Lille, is applied in four manufactories in England.

Cellular tissues.—It has recently became a perfect fashion among manufacturers of paper to produce cellular tissues (cellulose), if only in the way of experiment, of which the Universal Exhibition contained many samples in the form of small quantities of wood stuffs and sheets of paper. This mania, however, can only be greeted most cordially by all parties concerned, for the more numerous the experiments, the greater the probability of the discovery of the most rational process becomes. It must be admitted that wholesale manufacture in dealing with this subject has brought very respectable results to light. In the Exhibition there are several systems of manufacture, or more accurately their results, displayed; and we can only regret that no system was illustrated by production of machinery and apparatus, or even by a model. In this branch of manufacture we found England represented by samples of material and papers from James Lee; samples of material and papers from McNicoll, who also exhibited his apparatus for boiling by steam. France, Germany, Austria, also showed specimens of this class of goods. The process hitherto most commonly put in operation for wholesale manufacture is that of James Lee of Lydney, England. We take the following from the communications of his representative engineer C. M. Rosenhain, of Berlin. James A. Lee has already erected six manufactories in England, five in Sweden, and one in North America, and six are in course of construction in Germany. The samples of woodstuffs in the Exhibition were from the following factories: Wernbohl in Soedermanland; Dalary near Elmhult, in Smaland; and Brokhult near Soederkoepping, in Eastern Gottland. Each of these factories delivers 22 tons weekly of chemical wood stuff, for which 30*l.* per ton is offered in England. The following is James Lee's process. The wood, stripped of its bark and consisting of whole trunks or fragments, but not of shavings or saw dust, is cut up by a machine. The most careful experiments have proved that wood can only be boiled down uniformly when the pieces are all of one length and thickness and put into the boiler in layers pressed as closely as possible together; and this is excellently well provided for by Lee's cutting machine. The cut wood is carried from the cutting machine to cylinders of perforated metal plate, which when they are completely filled are arranged in a horizontal boiler and remain there during the boiling process. When there have been put into the boiler as many cylinders filled with cuttings of wood as it will contain, the opening is screwed down, soda is pumped into the boiler, and the process of boiling commenced with a fire on each side of the boiler. When the fluid inside the boiler has reached a temperature equal to about 10 atmospheres pressure, that is to say, in 3½ to 4 hours, the process of boiling is ended, the fluid is let off and the boiler cooled down, and metal cylinders filled with boiled wood stuff are taken out of the boiler, to be ultimately emptied into a metal vessel fitted with a horizontal apparatus for stirring. When the wood stuff, mixed with water, has been stirred about in this metal vessel for a short time, it flows into a "wash machine," wherein it has to pass through 13 horizontal cylinders fitted with brass sieves so arranged that the cleanest material has to come in contact always with the purest water. From the wash machine the washed out stuff is pumped into two wooden vats fitted with vertical apparatus for stirring, from which it is passed by an endless sieve between two revolving horizontal cylinders, and is there freed from the greater part of the water it contains. The strips of wood stuff, dried down to about 50% of water in this manner, are then received by drying cylinders, carried by rollers over a steam pipe and so arrive finally, perfectly dried, to a cutting machine, which cuts them into the shape in which they are sent away. Very few paper manufacturers have means and local facilities for establishing their own woodstuff manufactory,

and the value of the woodstuff is therefore dependent on its fitness for transport, *i.e.* its absolute dryness. J. Lee is, up to the present, the only manufacturer who produces machines which produce perfectly dry cellular tissue. Of the soda used in boiling the wood 75 per cent. is recovered in a fluid state. The produce in dry wood stuff is about 35% of the wood consumed, this latter having been previously air dried by lying two months in the forest. The production of 20 centners of wood stuff consumes:—56 centners of dried wood, 15 centners of caustic soda, of which 75 per cent. is recovered; so that the quantity consumed is only $3\frac{3}{4}$ centners, and 40 centners of coals and 18 centners of chalk. The cost of producing 100 lbs. of unbleached cellular tissue is 4 thalers 4 silver groschen (12*s.* 6*d.*). In bleaching the stuff, 35 pounds of chloride of lime are required for 100 lbs. of wood stuff, and the bleached stuff costs 6 thalers 10 silver groschen (19*s.*). The smallest machinery erected is arranged for producing 200 centners per week; and J. Lee constructs for 200, 400, 600, 800, 1,000, and 2,000 centners of production per week. The motive power required for this is from 30 to 65 horse power. The consumption of water in one of the medium sized establishments is about 70 cubic feet per minute. The chemical composition of the water is of no importance. Entire machinery for one factory, with steam motor, to produce weekly or in six days of 24 hours 400 centners of dry bleached or unbleached wood stuff, costs without packing and setting up free on board in the London Docks 10,059*l.* sterling; H. P. 35. Machines for steam power to produce 200 centners per week cost 9,324*l.* sterling.

For the information of the trade Herr Rosenhain gives a short statement of the annual consumption of paper in different countries showing that—

Germany consumes	- - -	3,200,000 centners.
Austria „	- - -	1,260,000 „
France „	- - -	2,590,000 „
Great Britain „	- - -	3,300,000 „
Russia „	- - -	670,000 „

The papers exhibited contained about 75 per cent. of cellular tissues, and partly of pure wood stuff.

John McNicol produces cellular tissue upon Sinclair's patent in the following manner. The wood is first cut, and then boiled in upright boilers under a pressure of 12 to 13 atmospheres. The steam required for this is generated in a separate steam generating apparatus which consists of 24 forged iron pipes. The steam comes out of these pipes into the common steam reservoir, and from there through pipes into the boiler. This steam generator by the peculiarity of its construction gives great security against explosion. It consists of tubes forged at a red heat and not more than ten nor less than four inches in diameter. Every boiler, before it is set to work, is proved at 500 lbs. pressure per square inch. The tubes are not easily dismounted, dirt and deposits can be readily removed by scrapers, the rust is swept out by a thin jet of steam. The wood boiler itself is built in with masonry, it receives the steam from a perforated vertical pipe rising up in the middle; is filled from the top and emptied from the bottom. The stuff, boiled with soda, is pressed out by means of a press, and either sent away or then and there softened in rag-engines, bleached in bleaching cylinders, and distributed to the paper material. The soda is recovered by means of a peculiar evaporator which restores 80 per cent. of the originally delivered quantity. More precise details of this system, and information as to the number of factories erected for carrying it out, could not be obtained.

Bryan Donkin and Co., Bermondsey, London, exhibited a model of their paper machine, which could also be put in motion. The model shows vats with apparatus for stirring the material contained in them, a pump for the material and the complete paper machine with transference. Two pulp strainers are introduced, lying close together, having clefts in the plates, behind a long "sand fang." The suction apparatus is covered with a perforated metal plate, which must in any case contribute much to the conservation of the sieve. An "égouttoir" is in front of, and another behind the suction apparatus. The coucher and wet presses are worked by leathers from an

elongation of the shafts of the second press. The drying apparatus consists of eight cylinders of which first come three below and two above; then follows a moist-glazing press, then two more cylinders below and one above. Behind the drying apparatus stand two three cylinder glazing presses and a recumbent reel with contrivance for rolling up.

Parts of Paper Machinery.—In the English department of the machinery exhibition was a revolving pulp strainer exhibited by James Bertram and Sons, of Edinburgh, Scotland, which is quite a novelty of its kind. Every manufacturer of paper is familiar with the imperfections and consequent inconvenience of the pulp strainer in common use. In most cases they are too small and, when there are several of them, occupy a great deal of space; they are easily plugged up and then produce inequality in the flow of material and in the thickness of the paper. In order to force the pulp through the crevices it is customary to open the plates, and the shock of this has the undesired result that the lumps get nipped in, or squeezed through. In the absence of careful attention it can easily happen that the stuff flows over, and totally spoils a quantity of paper. To alleviate, if they cannot be avoided, these inconveniences is the object of the so-called revolving pulp-straining apparatus. The improved revolving pulp strainer of James Bertram and Sons (agents A. Rack & Co., machinery builders, Heugasse 24, Vienna) is provided with the patent suction apparatus of J. and R. Wood; and forms a complete and independent self-contained machine which keeps the material pumped in and gives it off free from lumps on to the sieve. The machine is constructed throughout in iron and brass, and can work alone or in connexion with the paper machine. A centrifugal pump pumps the material into an iron box in which is the pulp strainer, consisting of four plates having slits in them which closely welded together form a prism, the base of which is square and formed by the breadth of the plates, and the length is equal to that of the plates of the strainer (Knotenplatten), &c. The revolving pulp strainer of Henry Watson, Newcastle-on-Tyne (agent Julius Oberhott, Getreidemarkt II, Vienna), was not in motion. Its principle is the same as that described above.

The Raw Materials and Papers in the Exhibition.

England. The highly developed and dominating paper manufacture of England was also imperfectly represented at the Vienna Exhibition, there being only two exhibitors of papers and two of samples of cellular tissue. A. Cowans and Sons, paper manufacturers, of Edinburgh, represented, in respect of quality, the fame of English paper in a distinguished manner, and rank among the leading firms of their country. Their white, tinted, glazed, ribbed, and design paper were exhibited in great variety and unrivalled beauty of finish. The sizing of the paper is so carefully done that the paper has to travel a quarter of an English mile before it leaves the drying apparatus.

A remarkable thing is the imitation of antique paper for the reproduction of old books. T. H. Saunders of Dartford, Kent, sent hand-made paper, bank note paper, parchment, cards, drawing and writing paper in similar perfection of finish. A speciality of this firm is their transparent parchment paper. The samples of cellular tissue of James Lee and McNicol have been commented upon already in the remarks respecting raw materials.

To summarise the characteristics of the separate exhibits: Austria and Germany were in quantity and quality represented in the most thorough manner; France, England, and Russia by productions, weak in quantity but of superior quality; China and Japan by rare and varied produce, and all others defectively. At the head of the paper industry to-day, as before 1867, stand England, France, Germany, and Austria.

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PAPER HANGINGS AND COLOURED PAPER.

Report by DR. WILHELM FRANZ EXNER, *Professor of Mechanical Technology at the "Forstakademie" at Mariabrunn, k.k. Regierungsrath.*

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A series of paper-hangings exhibited by the celebrated designer Owen Jones, contained specimens of hand and machine printing. The greatest part were of the latter class. They comprised cheap and expensive patterns in many varieties of colour; dull coloured French patterns; imitations of nature and fancy designs; but most abundantly stylistical papers beautifully designed and not at variance with their original function of substituting woven tapestry. Every variety of technical process was illustrated in this portfolio, exciting astonishment at the fertility of Owen Jones, and an acknowledgment that the wall paper manufacture of England does all that could be required of it. Owen Jones appears to exert a very great influence on the manufacture of wall papers, and I attribute to this the striking improvement in the cheap and simple papers which must be noticed by every observant visitor to London in the last few years. Tasteful and simple machine-made papers have found their way even to the basement rooms of hotels and the garrets of private houses. Two or three colours impressed by cylindrical printing on paper coloured in the rag engine produce the irreproachable decoration of the residences of even the less wealthy Londoners. Some of the hangings of the collection of Owen Jones are evidently only displayed in illustration of the versatility of the genius of the celebrated compiler of the "Grammar of Ornament." They will hardly contribute to his renown; in fact, nobody but he would venture to submit them to the criticism of specialists.

A speciality that comes beyond dispute within the province of paper hangings must be mentioned in this place. This is the "Japanese Curtains and Tapestry," produced at Pavy's Felted Fabric Manufactory (warehouses 51, Oxford Street, London, and 71, Upper Street, Islington; manufactory 13 and 15, Hamsell Street, Falcon Square, London). These are improperly exhibited in group V. of the English section. By reason of its long fibres and felt-like structure the Japanese are able to make a number of things out of their "Brussonetia" paper, for which our European paper is quite unadapted. The resistance of the Japanese paper to flecture is incomparably greater than that of our papers. Japanese paper is peculiarly adapted to curtains, drapery, coverings for furniture, bed hangings, blinds, general upholstery, and other decorative objects. The first feeling of surprise at the suggestion of making drapery of paper must be overcome, and calm reflection will bring to light the possibility of such an application and the economy of it. Our forefathers, we may be sure, were not less astonished in their days when the suggestion first came under their notice of substituting the woven tapestry of the walls or the Gobelin tapestry with paper. Pavy's manufactory, avowedly following the example given by the Japanese, has now devoted itself to the imitation of the brocades of Lyons, the reps, woollen silk damasks of Paris and Roubaix, the Cretonne of Muhlhausen, printed chintzes, and other decorative stuffs in a thick elastic paper, by the help of the new discoveries in paper manufacture. The specimens of this paper that I obtained, contained fibres of wood, hemp, and cotton. The paper which is generally embossed with a different design on each side, and richly gilt on the right side, at a short distance cannot be distinguished from woven stuffs. For curtains, draperies and the like, the borders are edged with folded stripes of the same material, and the general treatment resembles that of woven stuffs. The fall of the folds is not so rich, but the eye does not perceive this until the deception has been ascertained by other means. The idea at the bottom of this manufacture is not at all new. In former exhibitions we have repeatedly seen, for example, coverings for furniture in imitation leather, but the carrying out of the idea to all its consequences, the happy selection of designs, and the excellent manipulation, entitle Pavy to special commendation. The ivory

pavilion, which was scarcely completed and still so damp that the officials permanently occupied in it suffered from the circumstance, contained a saloon which was papered by Pavy with his patent felt. The article could not well have afforded a more brilliant proof of its durability. The decoration of the saloon was completely successful. The applicability of Pavy's material is determined by its price. A pair of curtains in imitation of Cretonne or wool fully complete cost from 6 to 11 shillings; a price little in excess of the mere upholsterer's work on such curtains. Luxurious silk brocades that would cost 100 to 200 guldens for one window, cost in the imitation 5 to 15 guldens. The durability of these imitations is, however, far more than 20 times less. It may be true that these paper curtains do not hold the seeds of contagion like textile stuffs, that they are more easily freed from dust and suffer less from smoke. It is certainly easier with them to follow changes of the fashions, and the cost of washing and refitting our white curtains is saved with them. This thorough description is justified in the absence of interesting novelties to notice. It would, however, not afford any adequate compensation for the absence of a serious discussion of the productions of Jeffrey, Horne and Marsdon, Scott and Cuthbertson, Potter, Heywood, Higginbottom and Company, Woollams, Land, Cooke, Kilie and Lockhead, and others who, one and all, declined the invitation to Vienna.

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WRITING, DRAWING, AND PAINTERS' REQUISITES.

Report of IGNAZ NAGEL, *of the "Südbahn" (South Railway), Vienna.*

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Envelopes. The number of letters, &c. sent through the post in the whole world in the year 1870 is estimated at 5,072,000,000 or 1,434,986 cwt. Wagner estimates the number of dispatches in 1871 at 67,000,000, of which 12½ millions fall to England and America, which together, adding the consumption of envelopes for letters, gives a total of 5,159,000,000 of envelopes. Such immense quantities can, naturally, only be produced by extraordinary means. The machines invented by Macquet in Paris, in 1842, and by De la Rue, of London, in 1845, were inadequate to supply the demand. The colossal consumption of this article of manufacture has only been satisfied in recent times by the machines brought to perfection by De la Rue, and by Poirier and Antoine of Paris.

Among the envelopes exhibited from foreign countries we must mention before all others those of Cowan and Sons, of Edinburgh, for the precision of their folding and the beauty of the paper.

Monograms and Crests.—There was but a small display in the Exhibition in this branch. The work of Wyon, the court engraver in London, must be mentioned as among the best. He sent very beautiful engraving work with sharp impressions. His impressions of armorial bearings and monograms must be considered as among the most successful bronze dies.

Steel Pens.—Small and insignificant in appearance as a steel pen is, it plays an important part as a writing material and an article of trade. Enormous are the quantities annually manufactured in Birmingham; enormous the sums of money that are paid to England for this production. Very few articles in constant use are the subject of so many varying erroneous opinions among the public. We do not, therefore, consider it superfluous, in a report on writing materials, to set right those opinions and the existing errors. The raw material out of which pens are made is steel. This steel must be of the finest kind and of equal grain throughout; and steel is and continues to be the chief material of which pens are made, because there is no other metal or alloy that possesses the elasticity and durability of steel. The so-called gutta percha pens, cement pens, aluminium and copper pens, and whatever else they may be called, are not made of

gutta percha, aluminium, copper, &c., but of steel, in spite of all that the advertisements may say. [Here follows a description of the process of manufacture of steel pens.] It will be seen from this that this branch of manufacture requires great care, thoroughly skilled workmen, and supplementary machinery of the very best construction It may be for this reason that the manufacture of steel pens is almost wholly confined to France and England, and in the latter country almost entirely to Birmingham. Germany has only one steel pen manufacturer; Austria only one; the other European states, as far as we know, contain none. America is said to possess two.

The difficulties that attend the manufacture are equalled by those of satisfying the requirements of the public in this article. There exist at least a thousand different numbers, and even this number does not suffice to meet the wishes of all. It must be noted as a mark of progress that the manufacturers study these wishes. Pens of all degrees of hardness are now produced for light and heavy hands; for very thin and fine, and for rough and strong paper, and for writing on cardboard; for correspondence, for book-keeping, for round-hand and quick writing, for autographic and caligraphic work, for the fine English and American handwriting almost devoid of all shading, as well as for the Hebrew and Greek characters.

As many erroneous opinions prevail respecting the invention as of the manufacture of steel pens. It is certainly an invention of the present century and originated in England. It has hitherto been frequently maintained that James Perry was the inventor, but this is now generally disputed From careful inquiries that we made in Birmingham we learned that a knife-cutler of Sheffield was the first man who had the idea of making pens of steel, and that a tinman of the name of Skipper, of Sheffield, afterwards manufactured the pens in great quantities. His son developed the idea still further. This, according to our informant, was 50 years ago. A steel pen artisan working in Birmingham remembers perfectly well reading the announcement in a window of the High Street in Sheffield, in 1816, "Steel pens are repaired here at sixpence apiece." There was a man named Spittle in Birmingham, who used to make steel pens by hand. He was succeeded by the Brothers John and William Mitchell, who were manufacturers of steel pens wholesale and by machinery about 45 years ago. Perry came afterwards and took out a patent for the first steel pens; and after him Gillott, who had learned the business with the Mitchells.

Since that time 11 important manufactories have been established in Birmingham, which produce about 140,000 gross of steel pens per week. One of the largest and most productive of these manufactories is that of Joseph Gillott and Sons, whose productions in the Exhibition may have been seen by the reader and admired for the extreme taste with which they were set out and for the brilliance of their polish. Gillott produces very genuine goods, and his book-keeping, lithographic, and autographic pens are particularly well liked. The coloured and damascened pens exhibited show much taste and art in giving such charming shapes to the little pens, but they are of no practical use.

C. Brandauer (401, New John Street West, Birmingham) was the second representative of the English steel pen manufacture in the Exhibition. It cost Brandauer, a German by birth, much trouble to win for himself a footing in business and a clientèle in England. At present his firm is among the most esteemed, and its productions, which make no great pretension, are counted among the most solid and useful in this branch. A pen with 12 slits in it showed how many times the difficult process of "splitting" can be done by careful treatment of the steel. As a practical novelty by this firm, we must mention the "manifold pen," which is very valuable for outlines and ornamental writing, making a number of lines in one stroke.

D. Leonardt and Company (69, George Street Parade, Birmingham) exhibited a great stock of pens. In the difficulty of always obtaining accurate information respecting the separate manufactories that exist, we must be guided by those data that we have, without being able to vouch for their accuracy. From these we gather that Gillott produces annually 1,000,000

gross of steel pens, Leonardt 750,000 gross, Brandauer, 500,000 gross. Leonardt, who has been established at Birmingham since 1848, has been manufacturing penholders, pen boxes, and similar articles, besides pens, since 1867. His manufactory employs 455 persons, mostly women, and is worked by two steam engines, with 110 horse power. We were shown, as a speciality, the steel pen originally constructed for signatures, which is now extensively used in the East, on account of its adaptability for making broad strokes. Leonardt's "Universal pen," with the point bent towards the paper, is a good pen for smooth paper, and admits of making very fine upstrokes. Less practical, in our opinion, is his "Reservoir pen,"—the reservoir becomes foul after a little use, the fluid congeals, and, the process of cleaning being difficult, the pen becomes useless. According to their own statements, the firm makes 4,000 different kinds of pens (but we must doubt this).

The steel pen manufacture in England is temporarily obstructed by the dearness of the raw material, of coals, and of labour, which also has no longer that character of steadiness that it used until recently to boast. In spite of this Birmingham produces annually about seven million gross of pens, which are sent in export to all parts of the world.

If we try to indicate the peculiarity of character of the English pen, we would say that it is especially adapted for firm writing on strong paper, and therefore that pens in England are mostly made solid and strong of the best material, and with great care and attention.

Gold Pens.—The first attempt to fit pens with points that would resist the corrosion of the ink dates from the beginning of this century, and was made in England. Glass, tortoise-shell, and bone, with metal points, were used for pens. These crude attempts did not continue, but they contained in them the germ of a more useful invention. John Isaac Hawkins, an American living in England, made tortoise-shell pens, to which he soldered diamond and ruby points. He soon afterwards succeeded in producing gold pens with points of iridium and osmium. Osmium and iridium occur in platina ores, a part of the osmium escapes in the smelting as osmium acid and leaves a deposit behind of the shape of hemp seeds, which are broken into small fragments with a hammer and then soldered on to the points of the gold pens with soft solder. These osmium points have the advantage of not being affected by acids, and resisting oxidation. The gold pen, in its present excellence and perfection is the production of F. Mordan, of London. It has gained a world-wide reputation, which it has maintained in the Exhibition of this year.

S. Neal and Company, of London, sent very beautiful porte crayons of gold, pyro-silver, ivory, porcupine quills, &c.; Schletter and Company, of Birmingham, pen and pencil holders, of mother-of-pearl and tortoise-shell. Leonardt and Company, of Birmingham, exhibited beautiful crayons, made by Whiley, of Birmingham. The penholders with reservoir exhibited by Maurice de Leon (London), and Lohay, Paris, do not fulfil the purpose they are intended for, as the ink soon settles in the cylinder, and stops the flow of the fluid, whilst the cleaning of the reservoir is almost impossible.

Ink.—From England: Alizarine and copying inks of H. C. Stephens (171, Aldersgate Street, London), which enjoy the best reputation. The very beautiful writing inks of William Lyons (Park Street, Manchester).

The marking inks and drawing inks of J. Blackwood and Company (18, Bread Street Hill, London), and the Jetoline of M. A. Bond, Southgate Road, London, deserve to be distinguished from others.

In conclusion, an article must be noticed that belongs to this category, namely, an ink bottle called the "magic inkstand," which, when it is simply filled with water without the addition of any ink fluid, is asserted to supply ink enough to write 10 pages a day for 10 years. This ink-bottle was sold in the Exhibition in the English section, and since the close of the Exhibition it has been introduced into the trade. The truth is that at the bottom of the bottle there is a purse or a sponge saturated with a tincture, which gives off a dark fluid into the water that is added, but only does so when the pen is firmly pressed on it, and even then the fluid is of uncertain

colour; on simply dipping the pen in the ordinary manner, the ink comes out pale watery. The magical inkstand is a piece of *humbug*.

Sealing-wax.—In spite of the competition of Nuremberg, and of the general use of gummed envelopes and wafers, the manufacture of this article is still vigorously maintained in England and France, the two countries which are principally called upon to supply the foreign demand for sealing-wax. The English manufacturers have the great advantage over all others of being situated nearest to the principal source of the chief component of sealing-wax, shellac. They are able to select for themselves this and the other raw material from the market to suit their wants and tastes, and their cinnabar and colours have been, from time immemorial, faultlessly prepared by the best of chemists and technical men. In one word they enjoy in abundance all the conditions requisite for the production of fine and good sealing-wax. The English productions displayed in the Exhibition do full justice to the good opinion generally entertained of English sealing wax.

The sealing-wax exhibited by Hill (H. Hill and Sons, 38, Bow Lane, London) in long sticks; and the wax for letters of Stephens (171, Aldersgate Street, London), J. C. & J. Field (Upper Marsh, Lambeth, London), and Lyons, of Manchester, were excellent for clearness of colour and purity in the fracture. The black wax of Lyons, of Manchester, was remarkable for its brilliancy of colour.

Drawing requisites. Lead and colour pencils.—Both England and the leading manufacturers of France were absent from the Exhibition; and it almost looks as if they were afraid of venturing upon a comparison with Germany. Since the exhaustion of the Cumberland mines, and the use of the graphite discovered by Alibert in the mines at Batougol in Siberia for pencil making, a change has passed over the manufacture of best pencils. The best drawing pencils are no longer made in England but in Stein at Nuremberg. This is at least the general opinion, confirmed by the verdict of the first artists of Germany and France, such as Cornelius, Kaulbach, Ingres, Horace Vernet, Isabey and others, who all declare that the polygrade pencils of Faber, made of Alibert's graphite, are the best, equalling or surpassing all modern productions.

Painters' requisites.—Although England does not occupy the leading rank in the art of painting, it is allowed even by the French who are very competent judges in this matter, that the English painters' colours are far superior to all other manufactures of their kind. So much the greater is our regret that the English manufacturers of these articles were all absent from the Universal Exhibition.

Painters' brushes.—Neither England nor France took part in this Exhibition.

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BOOKBINDING, CARDS, AND MACHINERY FOR BINDING BOOKS. Group XI., Section 4.

Report by Conrad Berg, *Bookseller and Bookbinder, Vienna.*

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The crown of victory in our craft belongs beyond dispute to the unrivalled work of England. Greatly is it to be regretted that only one British exhibitor represented his Fatherland in this craft, and yet he was certainly a worthy representative. Joseph Zähnsdorf of London (Catherine Street, Strand) has proved in the most honourable sense of the words what England is able to do in this article, and that there is the best field for the bookbinder who combines artistic taste with elegance and external beauty with durable solidity. The wealthy Englishman is generally a friend of large and costly collections of books; he is willing to pay the adequate price for the appropriate binding of a work. Every profitable invention which brings a practical benefit to the book or the reader, is joyfully accepted

in England, and no expense is spared in procuring the necessary apparatus for this purpose. The excellent English paper, and the machines, as ingeniously constructed as they are neat and precise in their operation, materially facilitate the task of the English bookbinder. In particular does the division of labour generally and rigidly adhered to in that country give him inestimable advantages; and thus it is made easy for our English colleagues to produce faultless work, perfectly satisfying the most exacting requirements.

The English bookbinder devotes equal attention to simple books, to elegant volumes, and to business books. Every workman undertakes his own part of the work in hand. Folding and stitching is commonly done by women in England, and the well-trained workman having only that part of the bookbinding work to do in which he is most skilled, the whole result of the combined work is bound to be most favourable. Zähnsdorf, to whom a well-earned medal of progress was awarded, exhibited simply bound books as well as bindings of luxury. The expert has to allow that the same degree of care and precision is displayed in the simply bound book as in the most surprising binding of luxury. Two copies of Doré's bible in Levant morocco bound with coloured leather mosaic and rich gilding freely applied by hand were particularly worthy of praise. The elegance of the colour combination, the noble style of the design, the masterly execution of the free gilding by hand, stamp these volumes as real works of art. The remaining bindings by Zähnsdorf were worked after old models in shagreen and pig leather with stamped ornaments; part were bound in polished morocco and decorated with machine and hand gilding.

Business books were not sent from England, but we may mention here that in this work also, as the Paris Exhibition of 1867 showed, it was England that produced the best for elegant simplicity, solidity, and convenience in use.

Bookbinding machinery.—It is a matter of regret that England was not represented in this branch.

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ENGRAVING AND ROSE ENGINE PATTERN.

Report of J. SCHWERDTNER, *Engraver, Vienna.*

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The English exhibition of copper-plate, displayed in a remote corner of the Art Galleries, has hospitably taken in the exhibition of medals from J. S. and A. B. Wyon, G. Adams, and F. Morgan. From the former we found not only a large collection of medals with portraits, allegorical figures, and armorial bearings, excellently engraved, but also a variety of impressions of the Great Seal of England, the Queen Victoria on horseback, the Queen enthroned between Justice and Religion, the Seal of State of Canada, and two impressions of the seal of His Royal Highness the Prince of Wales. These seals, engraved in the old Gothic style, are of extraordinary beauty, and there was nothing to equal them in the Exhibition. Messrs. G. Adams and F. Morgan showed exhibits in the same exquisite style.

England was represented in the craft of seal engraving by Wyon, with his artistically engraved seals of state, and engravings of armorial bearings, monograms on watches, and stamps for the manufacture of letter paper.

Intarsiatura Carving.—We come now to an art, hitherto very little cultivated in Austria, but much practised abroad, first in Italy, then in England and France. This is the engraving of inlaid furniture, which at the Paris Exhibition was almost a monopoly of the above-named countries, but has since that time been extensively introduced into Austria owing to the attention which has been directed to it by the Museum of Art and Industry. In the English department we noticed a cabinet with a secretary, the lower part of which we

had become familiar with at the Paris Exhibition. The cabinet work is excellent, but the ivory incised engraving is the finest specimen of that class of work ever yet seen. The unnamed artist must have expended years of labour over it, but it amply repays his efforts.

Although the inlay of ivory upon ebony presents no especial difficulty, larger spaces can only be brought to full effect in this method by the graving. In looking at this piece of furniture, which was sold for sixty thousand guldens, the real artistic value of an engraving in intarsiatura can readily be appreciated, since the value of the whole piece consists only in its design and the engraving.

Near to this object stood a table with inlaid boxwood ornament, which also is carved with just the same surprising degree of art and dexterity. The cabinet that is placed a little in advance is made with boxwood and ivory inlays upon foreign woods, the boxwood inlay and the ivory are carved by the same master hand. Moreover, in the design and the inlay, as well as in the carving of the veneers, the work of a great artist can be detected. It was impossible to learn his name.

An expedient hitherto unknown should here be noticed. This consists in the introduction of a bronze colour into the ivory carvings that are inlaid on the wood, so that the design falls into harmony with the similar woods into which the ivory is inlaid, and the effect of violent contrasts is obviated. A table and a box treated in this manner were displayed in the English section.

Flat or Surface Engraving.—When this is used to cover considerable spaces, such as cups, &c., with ornament it has now for some length of time been done by the help of the rose engine (Fr. guilloche). The English, who are accustomed to decorate their cups, tea-urns, &c., with none but classically accurate ornament, seldom make use of the "guilloche," which the French, and especially the Swiss, turn to the best account. It is an English invention, and came from England to France and Switzerland, where it was used in a great variety of ways long before it was heard of in Germany.

Letter Punching, Engraving for the Fount.—In England, we saw some self-moistening contrivances for printing the name of a firm with pressed letters arranged in combination in the same way as they would be in the compositor's letter case. This is a novelty, however, which cannot be praised for its practical utility, because the type screwed together is very apt to fall out, and has to be set over again. The manufacture of these stamps has come to be the work of the engraver, for there are a number of firms almost exclusively occupied with the production of these office requisites.

The highest degree of praise for work in enamel is due to the firms of Barbedienne in Paris, and Elkington and Company in London. The reporter on Group VII., Section 4, has comprehensively described their productions.

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PHOTOGRAPHY.

Report of Joseph Loewy, *Imperial Royal Photographer to the Court, Vienna.*

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Although the photographic exhibition of England could make no pretensions at all to completeness, and many of the leading representatives of this craft, such as Woodbury and others, were conspicuous by their absence, yet an idea could still be arrived at from the material displayed of the important eminence and the sterling excellence of the productions of that country. A remarkable feature was the aim of the several photographers at a certain originality or peculiarity of execution as opposed to the regimented works of the photographers of other countries. With regard to their idiosyn-

crasies in the selection of unusual subjects, I would not in all cases approve them; but, on the other hand, I think I can give them unqualified praise when the idiosyncrasy is manifested in the endeavour to adapt to every subject, figure, or landscape, its proper tone and light—to produce a picture with a distinct tone in it. Such pictures, showing the finest feeling and the most charming effect, were to be found in the English section, and they gave a true view of the close contact and connexion that there is between photography and fine art.

Particular attention was attracted by the pictures of Mrs. Julia M. Cameron, (Freshwater Bay, Isle of Wight) and those of Colonel H. Stuart Wortley, London; the former exhibited studies of heads and figures, in which she strove to imitate the arrangements and effects of the pictures of the old masters, especially Leonardi; peculiar and in many respects picturesque as these were, I would yet select, in preference, her portraits of Darwin, Herschel, and Taylor in the style of Rembrandt. Beautiful effects are here attained by the management of the light, and no retouches, either negative or positive, are applied; it is unfortunate that the photographic technicalities are rather neglected. Colonel Stuart Wortley produces a different kind of study of heads. I am inclined to call them stylistically executed. They are half-length likenesses artistically conceived, without any retouches, not very sharp in the outlines, but producing a singularly picturesque effect, by this, as well as by the careful management of their tones. The same exhibitor has also sent some landscapes, in which, however, the effect is disturbed by the absence of repose about the clouds. Beautiful portraits on a larger scale have been sent by Marshall Wane, of Douglas. Lewis Abel, London, was represented by very pretty portraits of children; the London Stereoscopic and Photographic Company, London, by an interesting collection of portraits of celebrated persons in cabinet and visite sizes and stereoscopic form, of beautifully clear execution, and further by some excellent stereoscopes of landscapes with picturesque accessories, which gave these pictures a peculiar charm and natural life. The pictures of Robinson and Cherrill, Tunbridge Wells, were especially eminent among the landscapes, and they were the most important in this branch of all that were in the Exhibition. These pictures were in the highest degree striking, not only for their extremely attractive subject, but also for the extraordinary beauty of their technical execution, and the really wonderful management of light that they displayed; there was one landscape especially, with an evening effect, from which it was hard to tear one's attention; they produced all the effect of the works of the most poetically gifted painters of landscapes. Brownrigg, Dublin, and Beasley, Junior, of London, likewise sent good landscape views. Beasley produces them with dry plates. As a specialist, Frank Haes, London is distinguished for his enlarged photographs of animals from the London Zoological Gardens. These are intended for educational use, for which they are very well adapted. The South Kensington Museum, London, also exhibited photographs intended for educational purposes, in some beautiful reproductions of works of art. Finally, there remains to be noticed a large group of persons, a drawing assisted by photography in the form of the large English steel plate engravings, exhibited by Lachlan McLachlan, of Manchester.

With the exception of the last-named picture, which is executed in autotype (colour printing), the English department showed nothing that was not silver printed; a circumstance as surprising as it is regrettable to the skilled observer, because many of the newer painting processes have been brought to a high degree of perfection in England already, and specimens, as interesting as they would have been instructive, might have been sent from that country.

Photographic Apparatus.—George Hare, London, had a large exhibit, consisting mostly of new kinds of apparatus; his various cameras and stands, small and large, were remarkable for the very solid and neat workmanship applied in their construction.

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COPPER PLATE AND STEEL PLATE PRINTING.

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Extract from Report by LOUIS JAKOBY, *Professor in Vienna, Member of the International Jury.*

As to England, I do not feel justified in assuming the works of art here exhibited to be a fair illustration of the productions of the present day. The works of Stocks and Cousins in the "black art" are excellent, and the publication by Kensington Museum is abundant; but we reluctantly ask, Is this all that remains of the great school of copper engraving founded by George III.? Are these the only successors of the Stranges, Earloms, Woolets, Burnets? Tools for engraving were exhibited by C. Ward & Payne, 114, West Street, Sheffield.

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LITHOGRAPHY AND CHROMOLITHOGRAPHY.

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Lithography, and chromolithography more especially, have, since the last Paris Universal Exhibition, made extraordinary progress in every direction. In the domain of real art its services have been truly important, and the scientific, manufacturing, and educational interests have been promoted by its rich illustrating power, whilst in point of national economy it has attained such great importance, that the expectation was justified of finding in the Vienna Exhibition a perfect, and therefore a magnificent picture of its operations. Unfortunately, this expectation was not satisfied. First, the partition of separate branches of art and industry into *states*, obstructed a view of the whole combined, and some states sub-divided their lithographic department still further by not exhibiting it in a room apart all together, but using the copies of oil and water-colour pictures for wall decorations, and adding the other parts to the departments of bookselling or education, or else they kept the group together, but in remote places difficult to find. Finally, the principal drawback was that England, the most important producer in the artistic part of chromolithography, was in this part not at all, and in the illustrative and technical branches very inadequately represented.

Turning from America to England, we found, as we have stated above, artistic printing in colours altogether unrepresented, and the illustrative and technical printing confined to the department of book printing, and to a small number of objects. This defect is truly to be regretted, for the English colour printing, which is maintained under peculiarly favourable conditions, and in consequence has productions as abundant as successful to exhibit, would have afforded opportunity to students of making instructive comparisons and serious and searching study of the art. It has grown to perfection naturally out of the English water-colour painting, for the cultivation of which there exist, in London alone, five special societies. Its reproductions are therefore of the rarest or most excellent water-colour drawings, enabling those who were not able to pay the very high prices fixed on the originals to collect for themselves an album of copies which none but trained connoisseurs could distinguish from their originals.

A further and equally natural step in advance was the imitation of choice pictures by old masters. In England, where classical studies are still pursued with great zeal, collections of the old masters are made by preference; but in this branch there are still fewer persons in the fortunate position of ability to buy an original picture, and it has therefore been attempted by colour-printing to meet an existing want, by imitating the most beautiful works as faithfully as possible. The English colour-printing thus enjoys the immense advantage of being supported by an immense organised trade for export, and finding ready market at good prices in America, in India, at the Cape of Good Hope, in Australia—everywhere, in a word, where the British spirit of enterprise has established its warehouses. On one hand, the publication of a new picture is

by this spread quickly over all the civilised world, and is followed by new works; and, on another hand, the high prices that are paid for good work encourage the employment of the best artists, at whose disposal an almost unlimited number of colouring stones can be placed. The further consequence is very careful execution and a richness in printing which reproduces the strongest colouring and the most delicate azure. But we are speaking of the absent. The little that there was to see in the English department was confined to some works of illustration or science which, though very correctly done, were not above the ordinary average of excellence.

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DESIGNS FOR PATTERNS AND DECORATIVE PAINTING.

Report of F. Lieb, *Professor in Vienna.*

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We will now pass through the gigantic building from west to east, and beg the reader so disposed to follow us with attention. Let all subjective writing be severely avoided, and we will only permit the facts to speak. When, emerging from the western portal, we set our foot upon the arena of strife of those nations of the globe that revere art and industry, we arrive, after a short walk, at the monarch of the group under consideration, Owen Jones, equally renowned for high merit as a designer and as the author of the most valuable work of the last decade. His exhibition, in the midst of his works at the principal entrance of the great longitudinal gallery on the left, as removed from others in locality, as in the excellence of the objects exhibited; distinguishes him, as usual, from his colleagues. Situated not in a corner, he obtained, in addition to his exceptional position, the highest distinction, the diploma of honour; and, free from envy—being well convinced of the merit as of the genius of this hero—we stand in front of his works with a feeling that they are not destined for our span of time alone. Let us not be accused of any want of assiduity, if language fails us to describe in long-winded commonplace that which is here presented, which indeed would be nearly impossible, or to delineate it so clearly in words that form and colour shall arise before the mind's eye of our readers. Here, as in that which is to follow, we must yield to impossibilty in this respect, and can only perform our duty of calling attention to such productions as deserve to be mentioned, leaving to a graphic work on the Universal Exhibition, or to the publications of the individual exhibitors on this subject, the illustration of the few remarks that we make, and their perpetuation in the memory of the visitors. And therefore all that we will say of the chief master shall be that his masterpieces contain gorgeous carpetings for spacious saloons, that the beauty of the lines of the principal parts of their arrangement is unequalled, and that the good effect of the colours is due to their repose and harmony. The good reputation enjoyed by English carpets is not to be ascribed to their quality alone, but principally to their design and colour, which now distinguish them brilliantly from the similar manufactures of France. This style is indeed peculiarly adapted to superficial ornament. The generally more than slight severity of style, and the prominence of contrast, with scrupulous avoidance of any imitation of plastic art, were represented by Owen Jones in the most perfect excellence. Throughout all these somewhat flat bright tones there prevails one separate pervading keynote of colour, pleasant to the eye, not interrupting the harmony of the whole, so that all these delicately accorded tones combine to one comprehensive harmony. Owen Jones does justice to that tendency of English taste, which predominates in the present day, and has become almost a national peculiarity. With creditable labour the English liberated themselves from French taste; the wanton, charmingly capricious, modern French renaissance; and, though we still see some stuffs ornamented with such designs (and with

much merit we are bound to admit), still it agrees better with the English temperament, with the respectability of the Englishman's life and the gravity of his character, most closely resembling the German, to surround himself with ornaments expressive of a congenial tendency. If he also appreciates French taste, he uses it seldom now, and it will therefore not be matter for surprise if we mention the fact that French designers at present are out of employment in England, and the orders sent to Paris are small.

India.—Just as melancholy was the impression received from a search for ancient Oriental splendour. That which was new was not good; and the little that was good was old. Where are the fairy tales of Oriental splendour? They have become fairy tales. The eye passes hopelessly over a foolishness of ornament devoid of style. Egypt and Turkey, and India in a less degree, cultivate taste à la Franca. The most meaningless flourishes are patched together at hazard without organization, the beautiful lines have vanished. The designers of the East have lost the national tendency in the same degree as their Russian colleagues have tried, and with some success, to find it. They had the best subjects in their old stuffs and carpetings, and had only to reach towards it, but they would be modernised, &c.

In 1851, England was defeated on the arena of industry that we are now treating of—totally defeated. France stood foremost and alone at that time in fashion and taste, rich in good designers, at the zenith of her best performance, defying competition. England felt her dependence, and from this bitter feeling arose the desire to achieve alone and unassisted what she depended on foreign co-operation to perform; indeed she sought not merely to equal but to surpass her rival by means of serious study of the national resources and treasures, by the creation of academies, museums, and other places of education. And England succeeded, laboriously, step by step; with unexampled tenacity ground was gained and made good, and the starting point from which further progress may be made is deserving our fullest recognition. The newly erected Kensington Museum collected the hidden wealth of the United Kingdom. Churches and convents, sepulchres and castles, dust and clay, have brought forth for the aid of industrial art progress, the loveliest and most splendid treasures, the art works of antiquity, from the middle ages back to remote times; long hidden, but scarcely rivalled at the present day.

An incalculably valuable handbook for all earnest study on the part of zealous artists, "The Grammar of Ornament," the work of Owen Jones, our now meritorious and distinguished Master, gave to the whole tendency a certain guide, an invaluable pilot.

What success had attended the efforts of England for the few years of her reorganisation in industrial art? Take, for instance, the year 1855. Scarcely the first indications of the movement were perceptible. The first steps had been made and they might be qualified as happy; small steps, but safe; the advance had not been great, but some conspicuous productions were already in evidence.

In 1862 a new Universal Exhibition opened its doors in London, and a widely different picture was presented to us. France still held her head high, and took the lead of her neighbour. But the progress of England was clearly evident, and, in many a branch, she even competed advantageously with France. Stuffs for ecclesiastical ornament should be mentioned here, but not as an isolated instance of victory.

In 1867, at the Paris Exhibition, gigantic progress had been made which placed Austria almost on an equality with the most advanced states, especially in articles produced by art industry; so that Austria maintained the same competition with both that England formerly did with France. In the designs or patterns a remarkable and certain tendency, an earnest study of style, was unmistakeably evident. If England, in this branch, was already great and had the first advantage, it was an advantage of precedence in time; and if Austria had anything to place in the other balance it was her native taste born of her rapidly increasing wealth and love of luxury, and her southern imagination.

CARRIAGES (*not for Railroads*) AND OTHER MEANS OF TRANSPORT.

Report by M. B. RIDELI, *Engineer, Vienna.*

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Before the Treaty of Commerce now in existence was concluded between England and France, the provisions of the French fiscal legislation respecting the importation of vehicles of luxury, were, to obviate the dreaded English competition, very severe. The system was most severely prohibitory, more especially against England, and no new carriage of any sort built in England was admitted into France. The English who resided from any cause in France, might only bring carriages that had been more or less used into France, and at the frontier station in France were required to deposit the full value of their carriages as import duty, of which three-fourths were to be restored to them if they sent back the same carriage from France to England within three years.

It will be readily understood that the French carriage builders raised violent opposition, in the inquiries that were held previous to the conclusion of the commercial treaty with England, against the free admission of English carriages, which was intensified by the circumstance that most of the French carriage builders had established their factories either in Paris or its neighbourhood, and their raw materials and fuel were there subjected to a heavy Octroi duty, which greatly increased the cost of production of the carriages. Nevertheless, they made the best of the still maintained though very low tariff, and saw their manufacture not only unshaken by the free trading treaty but emerging in vigour from the struggle; and the English manufacturers deprived of a not inconsiderable portion of their former sphere of supply; and three-fourths of the very large French production is now placed at high prices in foreign countries. Such a favourable condition of the trade was only brought about by the simultaneous liberation from import duties of iron and steel manufactures and other materials used in the manufacture of carriages, which materially reducing the expense of production, enabled the French coach builders to compete successfully with the English.

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ENGLAND.

The kingdom of Great Britain was represented in Paris in 1867 by 41 vehicles of luxury, whilst only 19 such vehicles came from England to the Exhibition of Vienna. The celebrated coach building firm of John Roberts & Sons, of Bridgewater, known by the style of "West of England Carriage "Works," was represented by a small two-wheeled vehicle for one horse, which is said to be very much used in the neighbourhood of their manufactory as the "universal Whitechapel dog cart." On the forged iron axle of this two-wheeled vehicle were two long four plate springs, in which hung a green lackered body fitted with cross bars, in which a number of persons could take their places back to back. H. Mulliner, coach builder, of Leamington Spa, exhibited three beautifully finished carriages, including one green "Victoria" (park phaeton) without a driving seat, for the owner to drive, on four ressorts à pincettes, lined with green shagreen leather, and a light dog cart, and a landau on four springs à pincettes, the body of which was lacquered blue, the carriage greenish white picked out with blue, and the inside of the carriage was lined with blue shagreen leather. The carriage manufactory of James Evans of Liverpool exhibited an improved Hansom cab, on the curved axle of which the body lacquered brown hung upon two long springs and had to support in addition the back seat for the coachman, the body was lined with light blue silk, and instead of the splash leather in front had a waterproof apron shutting with polished leather covering to it, which opened and shut with a spring. The cab was arranged for one horse, and part of the weight of the carriage would be thrown on his back in going. The five "carriages of luxury" exhibited by the London coachbuilders to the Court, Thomas Peters and Sons, belong undoubtedly to the most excellent of this class of carriage that was to be seen in the

Vienna Exhibition. Besides a two seated Brougham on four springs à pincettes, these manufacturers exhibited an extremely elegant coupé d'Orsay on eight springs, with green lacquered body, picked out with gold and green atlas fittings. The Imperial Austrian Armorial bearings were painted on the doors, the door handles were made to represent the Austrian double-headed eagle and gilt. The pièce de resistance of the English exhibition of carriages was the mail coach exhibited also by the above-named firm of T. Peters & Sons, built for "four in hand" and fitted with every comfort required for the races, the body lacquered blue, the carriage light red, and the fittings of blue shagreen. The body rested on the two axles, on four very strong springs arranged in the form of a square, and the two axles were united by a pole of considerable size. The forward wheels were prevented by the position of the perch from pivotting completely round the carriage, and the contrivance for turning this carriage was not in the "disk frame," but by the well-remembered old "friction block" newly discovered for this special object. Besides a powerful brake apparatus this mail coach was fitted with a luncheon box and wine cisterns, and a portable ladder for mounting to the higher parts of the carriage, which last arrangement is common to the Turkish harem carriages, and appears to have been borrowed from them. Two other carriages, a park barouche and a mail phaeton, were finished with equal comfort and elegance.

Of the two carriages exhibited by C. Thorn of Norwich, the two-wheeled Lorne car was remarkable for a patented contrivance, by which the shafts could be lengthened and shortened at pleasure to adapt them to the size of the horse. The carriage exhibited by C. Thorn and bought by Graf Adlerberg was a two-wheeled "Norfolk shooting cart" with dos-à-dos seat. The body was of basket work, and the rims were painted blue, the springs resting on the axle were 1½ metres in length. The carriage manufactory of F. & R. Shanks, 70, Great Queen Street, London, exhibited three beautifully constructed vehicles. One of them was a "four-horse drag" with a contrivance for keeping the team in close order. The body was blue, the carriage red, the lining of blue shagreen; the construction in other respects resembled the mail coach above mentioned. Besides this carriage a small sociable landau was exhibited by this firm, also a driving phaeton with patent head, both of which were built with the greatest carefulness. The carriage builder C. S. Windover of London exhibited two carriages, including a Victoria for the owner to drive, with green cross bar body (Sprossen Kastchen), green shagreen lining, and seat for a servant behind. A canopy with green fringe overhung all the seats of this Victoria. It was supported on one iron in the frame and could be fixed in any selected position. It could also be removed altogether along, with its iron and folded into an umbrella case, or used as an umbrella. The performance of this practical joke excited an extraordinary degree of interest among the distinguished British visitors during the whole course of the Exhibition. From the manufacturer and purveyor to the Court, John Ward, Leicester Square, London, a collection, as numerous as excellently constructed, of portable couches (for invalids), children's perambulators, invalids' chairs, &c., was exhibited.

In the exhibition of wheels, axles, springs, and other component parts of carriages the great English manufacturers took on this occasion scarcely any part. There was only the "Kirkstall Forge Company," of Leeds, which sent seven pairs of carriage axles with boxes, &c., to the Exhibition. The firm Homes and Hickton, Halesowen, near Birmingham, sent an assortment of nails for horse shoes. The London manufacturer, H. Hopton and Son, of George Street, Euston Square, sent a large collection of spokes for wheels, wheel naves, felloes, splash boards, carriage poles, shafts, splinter bars, and so forth to the Exhibition; all of different kinds of wood in great variety. The situation of the English carriage building industry is well-known to be more favourable than that of any other in Europe. The cost of procuring raw material is the lowest that can be imagined, for example, an English carriage builder can buy the quantity of steel required for the construction of a small carriage for 16 francs, at the utmost; and for a carriage with double springs the steel scarcely costs him more than 50 francs. In East India or other English colonies the foreign woods are found; among these mahogany,

hickory, American acacia, and at present a fair quantity of teak (tectona grandis), ebony (diospyros melanoxylon), palisander (jacaranda brasiliensis) and others are used. All these can be bought by the English carriage manufacturers about thirty per cent. cheaper than in France. For the finest carriage varnish all European carriage builders have to go to England, and the same is true of paints, of which the French still procure their vermillions and greens from England. And yet, in spite of all this, partly in consequence of the rise in the cost of labour, partly in consequence of the circumstance that nearly every individual Englishman wants to have his carriage built to his own pattern, all the less simple forms of carriage are much dearer in England than in France, especially the innumerable "voitures de fantaisié; whilst those great English carriage building establishments, which invest up to 300,000 francs in their workshops alone, manufacture very large numbers of carriages on one model, which they sell uncommonly cheap. These cheap articles, under the designation of "articles de Southampton," mostly intended for export, have been found by explorers existing in large quantities in the interior of Africa, and the South Sea Islands, where, probably in barter for the produce of the country, they have come into possession of the unfortunate natives.

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CARRYING MATERIAL AND OTHER ROLLING STOCK FOR RAILWAYS.

Report by EMIL TILP, *Inspector of Machinery and Workshops of the Franz-Josef Bahn.*

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The requirements made by traffic upon the modern arrangements for locomotion are extending rapidly in every direction. The railway system, as it was initiated in its native country of Great Britain, and introduced, partly by British and partly by American engineers, on the continent, could not for long satisfy the conditions here, which are more exacting in respect of technical difficulties and commercial complications as well as extent of area, and thus it came about that the system of traffic was changed in a great many respects, and is constantly changing to this day, whilst the corresponding conditions of the little island kingdom, with its short and level lines of traffic, always remained approximately unaltered. The problems to be solved in the construction of carrying material may be summed up as follows: In the locomotives, greater efficiency in increased speed for the express trains on main lines, and the manufacture of mountain engines and locomotives for branch lines. In the carriages: increase of comfort and provision for health by the introduction of the arrangement of saloons, parlours, and bedrooms in the coupé. If we have for all time to thank the ingenuity of England for the invention of the locomotive, its development and rational elaboration, descending to the minutest details of the locomotives and carriages, belongs in part to America, but pre-eminently and essentially to Germany, Austria, and Belgium; in other countries the English types remained a long time unaltered and predominant, and in some instances continue so to this day.

* * The English model of locomotives for slow and express trains could not meet the requirements of continental traffic, because the latter demanded trains not short, light, and quick travelling, but heavily loaded and yet travelling over 30 or 45 kilometres, and the uncoupled disproportionately high English driving wheels had therefore to be abandoned.

Locomotives. — America exhibited nothing. England was only feebly represented; France, Italy, and Russia rather better; but Austria, Germany, and Belgium, made an imposing exhibition, and if there were any things wanting they were one of the new express locomotives of England;

for example, of the Great Northern Railway, a locomotive of the Righi Railway, Sigl's transportable locomotive for railway building and ballast trains, and especially an engine for branch lines with Grund's apparatus for limiting the maximum speed.

The discharge of the valves is always giving rise to new ideas, although none have as yet come into practical operation. The newest system is based either upon the addition of a piece joined with the valve on to the lid of the valve case, or on the insertion of a plate of metal acting as a spring. Ashton and Company, among others, have adopted this plan; a similar arrangement was exhibited in the English department.

The exhibition of locomotives included 47. Of these, Germany had 18; Austria, 15; Belgium, 6; France, 3; England and Russia each 2; and Italy 1.

A four-wheeled coupled tender locomotive, with a saddle-shaped water tank, but without any specialties in construction and work, was exhibited by Henry Hughes, of Loughborough. The tender locomotive "Victoria," made by Fox, Walker, and Co., of Bristol, has four wheels coupled and two running wheels, the latter and also the driving wheel in front, the coupled wheels behind the firebox. The moveable axle applied to shorten the wheel base has Adam's radial axle-box (moveable). A third coupled wheel, moveable laterally, would have been better adapted to the purpose. The feeding is performed by a pump and a Giffard; the steam distributor is placed inside, the water tanks are placed on each side of the boiler. The coupled wheels are fitted with brakes. Besides this there is Lechalier's apparatus. The heads of the guide rods and coupling rods cover the ends of the cranks. The elaboration is on the whole better than the construction of the chief parts, but it was not necessary to turn the flanges thin.

Amongst the goods trucks special attention was devoted to the conveyance of cattle. English models showed four-wheel and six wheel waggons, with very practical divisions, moveable and reversible walls and partitions, water cisterns on the roof, with a service by means of pipes, and all other requirements of a perfect model stable, but of these models only those intended for valuable horses could be adopted, as the waggons, on account of their open outside walls, were only adapted for conveyance of cattle, and were not even suitable for that purpose in a severe winter.

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STEAM GENERATORS.

Report by J. F. RADINGER, *Professor at the Technical High School in Vienna.*

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General Observations.—The thickness of the sheet metal was next brought under examination, and, for the purpose of comparison, I applied all the boilers to the formula $8 = x \cdot Dp + 3$ millimetres, in which D represented the ascertained diameter of the boiler, expressed in metres, and p the tension in atmospheres for which each boiler is constructed, taking account in each case of the riveting, whether it be single or double. Out of this appears the remarkable circumstance that the relatively weakest metal plates are those used in Austria; then comes England with plates a little thinner, but always double riveted in the longitudinal seams. Then Germany with plates double riveted, and thicker than the Austrian. Finally, France with the thickest plates of all. The American boilers ought properly to have been mentioned first, for they are single rivetted, and the plates only half the thickness of the European. The normal tension of steam appears to be 4 to 4½ atmospheres in England, and from 5 to 6 in the rest of Europe. Ten atmospheres

are attempted for the boilers of stationary engines, but my opinion, elsewhere confirmed, is that eight atmospheres is the most efficient tension for setting machinery in motion. The only sheet steel in the Exhibition was exhibited in two English stationary boilers. One was entirely constructed of steel; the other contained only a few dead plates of the furnace of this material. In spite of its high resisting power, steel plate seems to be little used, less indeed than was expected, because the whole price of the boiler is greater for the same surface with thinner walls, and the inequalities of the hardening are dangerous, both in the construction and in the use of the boilers. . . . . .

The contrivances for heating and for safety seem to be the same all over the world. America puts only one safety valve on a large boiler; all the rest of the world puts two. In England there is a fancy for fusible plugs or danger float gauges, and one French boiler was overloaded with automatic contrivances; but in Germany and Austria confidence is very properly reposed in the fidelity of the attendant.

The English Boilers.

The following were in action in the English boiler-house. Two boilers from W. & J. Galloway, of Manchester; two boilers of Daniel Adamson, of Manchester; one boiler of Cater & Walker, of London; one boiler of J. & F. Howard, Britannia Iron Works, Bedford; one boiler of McNicol, of Glasgow; and three economisers. The first represented the long known broad shape boiler, of which the heating surface is constructed of comfortable dimensions and on approved plans with the latest improvements in construction. With the last it is attempted to get in a smaller space, and by means of new details in the connexion of parts, all the advantages of the old system and a number of new ones which the old system has not. There was no place where extremes so remarkably met as here, where steam was generated in pipes of 7 feet diameter and in others of 9 inches, and with 4 atmospheres, and then, without any intermediate stage, with a pressure of 10 atmospheres; and where the objects seemed intended for the uses—here of a time gone by, and there of a time still to come. The steam passed in the former into a high expanding Woolf machine, and in the latter was throttled before a simple cylinder. Here we saw boilers without any plates at the borders, in which every corner was constructed of L-shaped bar-iron insertions, and others where the furnace had no riveting, but only welded plates. These possibly exhibited too much obstinacy of adhesion to long established use or too much advance in the direction of the future, exeesses of conservatism and venturous empiricism, rather than the progressive and bold science of the English exhibitors, and never did such extreme systems stand in opposition to each other as here; yet they were all distinguished by a common excellence, by that inventive ingenuity in the contrivance of details, and by that solidity in the construction which was and is a cause of the eminence and a consequence of the competition of English work.

None of the English boilers had a steam dome, and I will take the first opportunity to say more upon this circumstance in the course of my report. They were all of them fed by direct-action steam pumps (force pumps), and differed immaterially in the rest of their arrangements from those in use with us. The steam gauge of Schaeffer-Budenberg, Manchester, with the English scale of 15 lbs. to one atmosphere, was in use not only here, but also in most of the English locomobiles, and this extensive use bears the best witness to its excellence. More attention is paid to arrangements for keeping the boilers clean by periodical blowing off of the steam than is usual with us, and these are very conveniently contrived. The proportion of the grate to the heating surface is generally the same as with us; but in consequence of the superior quality of the coals the extension of the heating surface by the introduction of economisers is more general. Of all the English boilers in the Exhibition not one had the longitudinal seams single riveted. All of them were either double-riveted or welded.

The Galloway Boiler.

W. & J. Galloway & Sons, Knott Mill Ironworks, Manchester, exhibited two specimens of their well-known system of boilers, and announced that

nearly 3,500 such boilers were in use in England. The shape of this boiler is so well known that it is unnecessary to make a drawing of it. There is one already in the Austrian official report upon the Universal Exhibition at Paris of 1867 (IV. 68.), where three such boilers were exhibited. The alterations that have been introduced into it since that date are unimportant. The shells of the boilers were 7·3 metres in length by 2·13 metres diameter, and were constructed of comparatively small plates (eight drums of three sheets) of iron of a thickness of 9 to 11 millimetres, doubly riveted in the longitudinal seams. The two forward flues of 0·86 metres diameter and 2·13 metres length were made of forged drums, were bound and strengthened at the joinings with ⊓ rings, and each contained a grate of three times 0·61 metres in length. Immediately behind the fire-bridges these flues joined in one large oval flue of 1·72 metres horizontal, and 0·91 metres vertical diameter. This consisted in each drum of four sheets singly riveted round, and it contained 24 Galloway tubes and six side pockets. These last stand like half columns completely fitting in the curvature, increase the strength and efficiently prevent the draught of a flame of fire along the wall, driving it to make a circuitous course among the tubes, and keeping up that play of the heating gases on the metal surfaces, which so very much promotes the development of heat. The tubes are not riveted but welded and conically rolled, each of the side pockets is forged of one sheet of metal and riveted in on the line of the elliptic. All the corners appear to be constructed with angle iron; and the two flat headings of the boiler to be most carefully doubly stiffened (suggestive of the results of calamitous experience). Besides three corner plates on each heading, each of which was secured with long double angle irons, two screw stays of 55 millimetres diameter passed right through from end to end, fastened to each end with a cast-iron disc of 240 millimetres in size. But by this arrangement all longitudinal expansion by the elasticity of a plate is apparently prevented, and it must manage for itself. Those ⊓ shaped circular bands, to which the riveting of the external tubes is fastened, have to serve this purpose. But I consider it scarcely probable that these bands in fact retain any elasticity, even if one piece here or there may do so at liberty, because their behaviour is quite different when they are enclosed and riveted in, than it is when at liberty; and elastic expansion is only possible when the rounded fibres make larger circles or stretch considerably. Such a compensating arrangement with a barrel of such small diameter would be pronounced inadequate for the thinnest copper tubing. The tube has in consequence no alternative but to force its way through and press tightly on to the corner joints, and find out either here or in its own plates, those places in which the motion is dammed up, which is relatively increased by the circumstance that the external boiler above, for a quarter of its circumference, is exposed to the air in cooling. The contrivance for conducting the gases of the furnace was that usual in such boilers; they are drawn from the fire-grate through the tubes, then sideways forwards, and there they fall in with the last common draught, which carries them along the belly of the boiler to the chimney situated at the back. It is customary in England to aim at dispensing with the steam dome commonly used by us, because it is believed, not without reason, that one of the causes of the explosion of boilers is to be found in the weakening of its surface by the aperture made in it for the insertion of the steam dome. In the Galloway boiler that was exhibited at the Exhibition of Paris there was a cylindrical steam reservoir constructed longitudinally on the top of the boiler, on two pillars at a good distance apart, which received the steam, and held the pipe for its transmission. But there seem to have been radical imperfections in this arrangement, and we now found the steam valve of 170 millimetres put to all appearance immediately on the steam chamber. As a fac it did not open directly into the chamber, but into a horizontal tube with a slit in the top of it, covering about a quarter of the length of the boiler, which secured the regular and equable emission of the steam and thus obviated the formation of those watery deposits which are apt to collect under low escapes and deliver water or wet steam into the machinery instead of steam.

The safety valves of 100 millimetres were introduced on a common pair of pillars quite close up to the front end. This arrangement, considering how large is the fire-surface of the boiler, almost 40 square metres, appears highly unpractical. The pivot of each of the levers was a steel knife-edge inserted into a groove in the flange of the frame. On the top of the boiler there was, further, an alarm whistle for low water, and a man-hole with a screw cover, and a second man-hole with a cover (not made to screw on) was forward between the fire-tubes below. The situation of this last was so far back in the tubular joined piece that the hoops were placed inside it, and a metal plate which provided a flat bottom to the front, and satisfied requirements of beauty and cleanliness. Two glass water gauges, bronze feed, and escape valves placed symmetrically on the forward edge and inscribed with instructions to the firemen, the ornamental doors of the furnace fitted with turning handles: all these things gave to each of the boilers an elegant and substantial appearance. They lay five centimetres lower in front than behind, to facilitate the perfect evacuation of the water through the blow-off pipe, which was finished off at the deepest point with a cast-iron angle.

The dimensions of the fire-surface were 69·5 square metres; of the range 3·1 square metres, or about one twenty-second part of the boiler surface; of the flues 0·53 square metres, or rather less than one-sixth of the range in cross section, which may be described as quite adequate proportions. From the general system of its construction, but especially on account of the Galloway tubes introduced in the fire-tubing, this boiler must give good results in evaporating experiments. I am not so much disposed to call attention to the 10·8-fold evaporation, which was obtained (on reliable report) with, of course, the best Welsh coal, in which nobody knows how much belongs to the water carried off with the steam, or to the circumstance that in this evaporation 1·9 lbs. English of coals per hour and per indicated horse power was consumed to a machine of about 50 horse power.

With a condenser working in good condition, such boilers ought to supply steam enough for 250 indicated horse power at $3\frac{1}{4}$ to 4 atmospheres, which would correspond to 0·28 square metres heated surface per 1 horse power. The boilers in the Exhibition were declared for 4 atmospheres maximum tension, and the thickness of their plates appears to have been determined by the formula $8 = 0{\cdot}94Dp + 3$; but in appreciating this it must not be forgotten that they were double-riveted at all critical places.

The Adamson Boilers.

The two steam boilers of Daniel Adamson and Company, of Hyde Junction, Manchester, were of the same external dimensions as the above-mentioned, *i.e.* 7·30 metres in length, and 2·13 metres diameter. The two fire-tubes passed cylindrically through nearly the whole of their length, and the penultimate inner drum was the only one conical, reducing the diameter from 8·37 to 7·62 millimetres. One of the boilers was constructed of iron plates, the other of steel. The outer cover of each was of eight cylindrical drums, each of two plates of metal in circumference. The longitudinal joints of the metal, which was 13 millimetres in thickness, of the iron boiler were double-riveted, and the round joints single-riveted, but the plates, 10 millimetres thick, of the steel boiler were double-riveted throughout. The inner tubes consisted also of eight drums apiece, the ends of which, throughout, were turned in flange shape up and throughout rivetted with an intermediate ring to enable them to be fixed end to end. The longitudinal seams of these were welded, excepting the two rings nearest to the fire-box, which were constructed of steel plates and appeared double-riveted at the longitudinal joints (underneath the grate). One or two of the conical Galloway tubes was welded into each of the hinder drums, each fire-tube containing eight of these in a transverse position. There was one laid out in the boiler-house for inspection, the welding of which was scarcely discoverable, but after the close of the Exhibition I found a very evident welding several centimetres in length on the conical drum behind near the flange, in the boiler that had been in use. Each of the two headings was of one piece, and the back head-

ing was riveted with inwardly curled flanges into the shell of the boiler, the outwardly curved flange ends of the fire-tubes coming against the apertures bored with the turning lathe. Each of the headings was provided with corner-pieces, five above and two below, which were alternately joined to the first and second of the external drums, and had besides an angle-iron riveted on between the openings of the tubes and the external lips. The outwardly curled flanges of the tubes, or more properly speaking their circular edges, were surrounded by an angle ring bending inwards (at the mouth of the tubes) which was riveted both to the heading and the tube; and held firm the corners and spaces which were liable to be bent by the expansion of the tube, thus preventing, it was said, the corrosion which is generally to be looked for at such places. But the impact of unyielding parts also assists to obviate leakage. The other fire-tube flanges however appeared curled on large diameters and their considerable numbers may very possibly admit of the longitudinal expansion that tubes of this character require. A further advantage of this mode of connecting the parts is the withdrawal of all rivet heads and accumulations of material from the influence of the first furnace. This has been long understood but from the costliness of its application not very commonly acted on. All the riveting holes were, it is reported, bored after the bending of the plates and with the special boring machine constructed for this purpose. In this way the holes, not distorted but exactly round, are exactly filled by the bolts, in the best manner, as we were shown by the section of a piece of riveting which was laid out for inspection in the boiler house. Only in that case copper rivets instead of iron were exhibited to distinguish the rivet from the plate by the difference of the colour.

A remarkable appendage to these boilers was the provision of each with a steam valve, the split connecting pipe of which, exactly as it was with the Galloway boilers, passed into the interior; there were also to each two separate safety valves directly weighted on the well-known design of the Manchester Boiler Society, in which the valve is put at the top of a rather tall pipe and is held down by a crank from which the weights encircling the pipe hang. But this system of weighting the valve, apart from the inconvenience attending its removal and the possibility of eccentric action of the rings, has the great disadvantage that the further the pressure of steam is from the safety valve the heavier is its maximum. Underneath the hindermost valve and inside the boiler there was again a lever with a long arm on which a balanced floating gauge was suspended, the sinking of which was to push up the door of the valve with a rod whenever the ebb of the water left it dry. This also is in all probability a complication that is often out of order.

Every fire-tube had also a piece of brass tubing on the top of the second drum, on which was screwed a brass cap with fusible plugs in order to extinguish the fire when the water sank too low, being however still a few centimetres higher than the tubes. The escape and feed water openings were in front, as in the Galloway boilers, symmetrically on both sides, on the level of the middle height of the water, and continued by horizontal tubes into the interior.

These boilers, exactly like the Galloway boiler, were each fitted with an upper and under man-hole, the upper of which was circular, opening with about 20 screws, whilst the lower seemed pushed so far inwards that a guard-plate could be introduced before the frame making the front view of the boiler level. The firing of the boilers was done in front on the grates inside, which were each 1·85 metres in length, and the gases falling then into the lower channel passed along through it forwards together, their union being effected through a short branch of 50 centimetres length. In front they separated again to pass to the back in the two side flues and so to the chimney. Each of these two side flues had its separate trap for regulating the draught, which was regulated from the front with conical wheels, shafts and cranks. I can conceive no other reason for this exceptional arrangement than perhaps the promotion of the boiling by concentration of the fire to one side of the boiler. This supposition is confirmed by the proportions in cross section of the flues, which contained 0·60 square

metres in the common lower channel, but 0·40 in each of the side channels and 0·55 square metres at the traps. The heated superficies may be estimated at about 65 square metres, the surface of the grate at 2·9 square metres and $\frac{1}{22}$d of the heated surface, whilst the flue occupied $\frac{1}{5}$th of the surface of the grate. These proportions are completely correct and adequate. The boilers were adapted for a highest pressure of 4½ atmospheres, and the double-riveted plates seem to be calculated on the formula $8 = 1Dp + 3$ millimetres. The weight of the iron boiler was 10,500 kilogrammes, that of the steel boiler 10,000. They both stood for sale at the close of the Exhibition, liable to duty and for delivery in the Exhibition, with all their fittings complete, at the prices respectively of 625*l.* and 670*l.* sterling.

Cater and Walker.

A remarkable boiler varying in many respects from the systems hitherto adopted was the Patent Cater boiler of Cater and Walker, Southwark, London. The cylindrical shell of the boiler was 4·26 metres in length, and 2·13 metres diameter, and heated under the front part by a grate 2 metres in length, and 1·22 metres broad. The gases passing at the hemisphere of the boiler to the back, were stopped 74 centimetres from the back heading by a broad return chamber, cutting diagonally across the boiler, open below and at the sides, and 84 centimetres in height, and 55 in breadth, the upper part of the forward wall of which received 42 iron pipes of 95 millimetres breadth, and the back wall was cooled for a breadth of 19 centimetres by the water. The pipes now passed forwards and upwards on a gentle decline, and came out into a second chamber, 55 centimetres in depth, which appeared inserted in the boiler in front. This had concentric side walls at the distance of 16 centimetres from the shell of the boiler, and their height of 1 metre was bounded by flat plates. A second group of 62 narrower pipes (each of 75 millimetres in width) then passed out of the upper half of this chamber, again ascending a gentle declivity, backwards, and ended in the heading of the boiler from which a smoke-pipe led into the chimney. Three perpendicular tubes were riveted in the front chamber of 130 millimetres diameter each, and one horizontal of 150 millimetres diameter in the hinder chamber. These powerfully strengthened the walls, and at the same time secured a good circulation for the water. The headings of the boilers were further strengthened, each by four upper corner angles, the forward one had further two lower corner angles, and the hinder had stays which united it to the hinder wall of the return chamber. Each of the boiler headings was of one piece and flanged. The back heading was cut out sufficiently to provide for the tubes leading out through it, through a plate riveted on in a peculiar manner, with a view to facility of repair. The shell of the boiler was constructed of five conical drums of plate, 16 millimetres in thickness, the longitudinal seams of which were doubly rivetted, which would satisfy the formula $8 = 1{\cdot}5Dp + 3$. In the prospectus which was printed for the Exhibition and circulated there, there appeared a steam dome set on the boiler, but it received actually a steam reservoir of 2·6 metres in length, and 1·2 metres diameter, which was supported and balanced by the only connecting stay of 40 centimetres breadth. It appears also that the dome was replaced by the reservoir at the last moment in accordance to the more recent tendency in England already accounted for, to discard the dome. The steam valve was placed above on the reservoir. But for the prevention of the collection of water under the stay, it was not placed vertically over it, but backwards, and the weight was thrown on to the centre of the reservoir by bending it forward with a knee tube, cast on to it above the middle, so that the axle of the wheel lay in a horizontal direction.

This boiler exhibited a system of construction most admirably adapted for transport, because the masonry consists of one simple bed for the body of the boiler to rest upon, which is not exposed to the action of any flame, and is not made use of for any other purpose. The front chamber has double doors, opening the passage through the tubes, and a cleaning door at the back, giving admission to the return chamber. The fittings of the boiler were of the usual description. It contained two water gauges in front, a steam gauge

at the top, which, at the commencement of the Exhibition, was fitted in such a manner as to be out of sight of the stoker standing below, and two safety valves in front weighted by levers. One of these was enclosed in a cover which had a grating in it near the valve plate. There were three appendages to this boiler, one for the valve, one for the steam reservoir, and one for the man-hole; all three were flanged at the lip and riveted. The man-hole cover could be screwed on or laid on to its place at the discretion of the stoker, because the screwed out iron plate held an elliptic man-hole cover of strengthened plate by two bolts. In the lower part of the heading of the boiler in front there was another man-hole with a cover not made to screw on, which gave admission to the space underneath the tubes. The working pressure at its maximum was not to amount to more than four atmospheres, the heating surface was about 105 square metres, the size of the grate 2·4 square metres or $\frac{1}{44}$th of the heating surface; diagonal sections of the lower tubes gave 0·30, and of the upper tubes 0·27 square metres, which amount to $\frac{1}{8}$th and $\frac{1}{9}$th respectively of the area of the grate. It will be seen from this that the dimensions of the grate in proportion to the diagonal section of the tubing were unusually large, but in proportion to the heated surface they seem too small. This disproportion is still further illustrated by the circumstance, that the boiler, according to the statements made, produces steam for 50 horse power, or normally evaporates 50 cubic feet, English measurement, or 1·4 cubic metres of waters in the hour. This shows to the square metre of heating surface only 13 kilos. (2·1 square metres) heating surface per horse power, which is just about the half of the performance of other good boilers in which the diagonal section is not so unfortunately small as in this. It would be impossible to make any extraordinary effort with this boiler, the normal action of which requires a strong draught to the furnace in order to drive the gases through the throttling tubes, and past the sharp corners. The Reading Iron Works, who have a character for prudence, introduced it with commendation in their catalogue. There were three of these boilers in the London Exhibition of 1862; that at Vienna bore the manufacturer's number 340. It weighed 12,500 kilos., and was offered for sale at the close of the Exhibition for 650*l.* sterling.

The Howard Boiler.

J. & F. Howard, Britannia Iron Works, Bedford, had set up one of their safety boilers in the English boiler house. These are intended for high pressure—ten atmospheres. These boilers contain absolutely no riveting, and they consisted of 20 separate tubes, welded and drawn, in a slightly slanting position, made of iron plate of 8 millimetres thick, each tube being 230 millimetres in diameter and 3·65 millimetres in length. Each tube was made fast at one end and free at the other, so that there was no impediment at all to its free expansion. The fastening, by which the interior of each tube had connexion with the rest, consisted in the attachment by screws of every five pipes that lay together in contact horizontally to four upright pipes in contact together vertically, and opening at the top by a narrow knee on each pipe into a steam reservoir placed athwart them. The reservoir was of cast iron, 1·8 metres in length, 350 millimetres in diameter, with sides 21 millimetres thick, and contained three ports for one steam valve and two safety valves. The feed-water tube ran diagonally in front of the lowest set of tubes, to each of which it was attached by screw, and every tube contained Field's contrivance for facilitating the circulation of the water. The fire was burning in front beneath the tubes and its gases penetrated the intervals of space among them on their passage to the flue, which joined on above backwards. They were not, however, admitted to a direct passage, but compelled by inserted plates of cast iron to stream first backwards on the two lower rows, then among the next row forwards, and then back again, their whole course forming a letter S. The lowest ebb of the water just filled the three lower systems of tubes, but the water, at its highest, never came up to the topmost rows, so that there were always one or two sets of tubes free from water, and as the last journey of the gases passed over them, the stagnating (?) steam they contained might possibly be dried or overheated. The free end of each tube was closed with

a short additional tube, useful for cleaning, on which came a flange of forged iron turned with a screw, against which a plate of cast iron, with four corner screws, was fixed fast. These fastenings, however, were separated from the influence of the fire by separate cast-iron plates, which were inserted among the tubes in front and formed a wall. There were also pipes of flat iron there supporting the tubes and securing them in their respective positions at an average distance from each other of 360 millimetres. The connexion at the back with the vertical tubes was provided in each case by a short intermediate tube, lying free at a distance of 5 centimetres, and having at each end a screw which attached it on one hand longitudinally with the horizontal tube, but on the other side to the wall of the wrought-iron vertical tube. This last was flattened off in front and behind, and its diagonal section measured 26 centimetres from one flattened side to the other, and 20 centimetres parallel to the flattened sides. It was 1·78 metres in height, its walls were 11 millimetres in thickness, and closed above and below by flat bottoms welded in. The tube in connexion with the steam reservoir of the shape of the segment of a circle was screwed into the cover of the vertical tubing, and was connected with the reservoir by a cylinder. The heating pipes were strengthened at each end by a ring welded on, into which the screws of the connecting parts were fastened. The masonry was covered above by plates of cast iron, which lay on transverse supports, and the whole was covered over with a light roof. The front wall consisted in like manner of a number of movable plates of cast iron, ornamented by a slight "Casettirung." A vertical flue carrying off the gases at the back of the masonry was necessitated by local conditions. For work, the arrangement of the tubes was admirable, and all points of connexion were permanently tight. I undertook a hydraulic test with 17 atmospheres over pressure before the Exhibition, and I inspected the boiler again when it was removed from its masonry after six months work. But with the solitary slight exception of one screw there was nowhere a trace of leakage nor an injury of the plates to be discovered, so that no objection can be raised to this boiler in respect of its lasting quality of impermeability. But its style of work is another matter. The water and steam rooms in this boiler are smaller than is usual. The pressure and the water level, therefore, are subject to quicker variations if there is irregularity in its management, they fall even suddenly and unexpectedly, very often, and the stoker is required to be particularly careful, and the apparatus to perform its work well in order to keep both within the limits of safety. The boiler must on no occasion be overtaxed, which it appears desirable very often to have the power to do. For even in the ordinary use of this boiler, the steam coming out of four or perhaps five tubes (10 to 12·5 square metres heating surface), and rising from the little water surface of the vertical tube of about 0·05 square metres (4,000 to 5,000 kilogrammes per hour and per square metre of water surface), will arrive very damp at the reservoir; and this drawback must be intensified by forcing the boiler. But where a quiet and regular working is provided for by an adequate number of these boilers, then the benefit of the impossibility of a higher pressure will be appreciable. The security against direct fracture of the pipes is, thanks to their small diameter, considerably greater than it is in the older systems, and the exhibited boiler had about thirty-fold safety with 10 atmospheres, whilst the old boiler laws are satisfied with eight-fold. The Messieurs Howard asserted that the tubes support a pressure of 100 atmospheres without the least damage, which agrees with the above. It is indispensible, however, that there be no loosening of a screw or other connexion from any cause to permit a tube to swerve from its place, as has happened in other boilers that have burst, if the boiler is to maintain its name for "Safety." It appears, from the above, to be a material improvement, and I remarked it in a boiler that was only brought in subsequently to the Exhibition, to traverse every tube with an anchor screw, the head of which is in contact with the back of the vertical tube, but the socket pressing on a bolt close behind the front end. The cleaning would be impeded by this, but the safety materially increased. These boilers are easily transported and set up. The removing of a tube that is damaged in any way by simply screwing it out (after putting a heated

ring on the screw to be loosened) and substituting a new one is done with proper fitting key, and there is no comparison of the time and labour require with that which the change of a fire-plate costs in the ordinary boilers. The space occupied by these boilers is small, and it is not difficult to keep them clean. The incrustation certainly settles more on the fire-plates than elsewhere, because all the feed water passes in there; but one knows where to find it, and it can be easily removed by blowing off or cleaning, so that this disadvantage is in part removed. The boilers were formerly constructed (see the Paris Exhibition, 1867) with vertical heating tubes instead of the horizontal tubes now introduced. The present system was adopted for facility of cleaning, and seems to secure the ascent of the steam bubble and the deposit of the incrustation in proper course, and further, every tube is more accessible. The mode of connection of the vertical tubing with the reservoir laid sideways by a bent tube is a recent innovation; it formerly lay directly athwart it, and the two were united by a short throat. But the inequality of their expansion made the elastic member necessary. They are designed for smelting purposes with enlarged reservoirs, and where they are to lie in extreme heat a fire-proof covering bars the play of the heated gases from the upper sets of tubes.

The heating surface of the Howard boiler exhibited (manufacturer's number, 1,612) was 42 square metres. The area of the grate measured 1·7 square metres, or nearly $\frac{1}{25}$th of the former. The flue with 0·4 square metres occupied somewhat less than a quarter of the area of the grate. The weight of the boiler was 6,000 kilogrammes and its cost about 3,400 florins.

The Sinclair Boiler.

John McNicol, 97, Buchanan Street, Glasgow, sent a boiler that was not set on masonry, but lay for inspection in the open air. The general arrangement of this boiler differs from that of Howard in that the inclined heat tubes in front and behind open into the vertical tubes, from which a circulation of the water should arise. Further there are four riveted cylindrical boilers connected with the steam generating system, of which two beneath the water level for half their diameter maintain the steam while the two upper boilers serve as steam reservoirs. The openings in the vertical tubes which admit the cleaning of the heat tubes are closed by globular plugs held on by bolts within and outside screws. Whether the conical adjustment of the heat in the vertical tubes is successful and the rigid tube gratings remain firm in use could not be determined from the cold new boiler.

The Economisers.

The coal savers or economisers are compressing heaters, which, lying in the escaping smoke, utilise its last available warmth through the feed water. Their modes of construction and operation are so well known that a description of them would be out of place here, and I will only mention that every one of the cast-iron pipes, of which as many are applied as the boiler has horse power, has a superficies of 1 square metre, a height of 3 metres, a diameter of 11 centimetres, and a thickness of material of 10 millimetres. They are said to raise the temperature of the feed water by at least 60 degrees Celsius, and are peculiarly to be recommended whenever it is desired to increase the production of steam by forcing the boiler. Now, in the event of the draught being so strong that a disproportionately greater amount of heat is generated on the furnace grate than the heat surface is able to take up, then the enlargement of the heat surface by any available apparatus lying in the issuing gases must have a beneficial effect on the heat result. Whether the economisers—which are constructed of thick metal, are only half superficially heated, are difficult to clean and not such as every manufacturer has the means of repairing at need—are precisely the most suitable apparatus, or whether the desired object could be more economically attained by other means, as by a different mode of increasing the heat surface, or even by putting up new boilers and restoring the old over-taxed one to its normal condition, I have not yet considered. In any case it is positive that a boiler of correct dimensions, and brought in its normal state to the task,

requires no economiser, or contains it in itself, because in such a boiler the gases only escape with that temperature that they require for their ascent in the chimney, and can therefore spare no more heat to give off. How true it is that the economiser can only be usefully applied when forcing the boiler is shown by the circumstance that it is proved to improve the draught. The maximum draught is known to exist with a temperature of about 250 to 300 degrees in the chimney, and decreases with rise or fall of the temperature. Consequently a greater heat than this must be drawn up before the introduction of the apparatus, after which the economiser is effective, it is true, as a coal saver.

Green's economiser is the most widely known. His tubes are inserted above and below with conical ends in the cast iron sockets of the principal tubes and pressed in by hydraulic pressure. In the line of the pipes covers are fitted at the tops, and a peculiar boring machine is used for occasionally boring out the incrustation from eight pipes at once. The soot scrapers which travel up and down the pipes are in two parts, and their gravity tending inwards presses their steel cutters against the tube. In Paris, 1867, they were single.

Twibill's was another economiser resembling that of Green, but it had screw-shaped cutters instead of level. His tubes were flanged and screwed above in place of the conical attachment of Green's.

Bell's economiser looks more like a specimen of excellent casting than an apparatus intended for wear. It consists of screw pipes of great breadth, that is, tubes of about 10 centimetres diameter, which are not straight but bent on a spiral with eight or ten twists on which the scraper guides itself, carried along by a central reversing shaft. A screw tube like this is naturally not cast in one piece, but in pieces of a half twist each with narrow joints on each side, which are afterwards welded with molten iron poured over. Internal cleaning is not possible; the connection with the welded sockets, however, is inseparably compact.

HALF-LOCOMOBILE BOILERS.

Boilers which on account of their light weight and freedom from masonry are easily removable, and are therefore called half-locomobiles, &c.

ENGLAND. Appleby Brothers, Emerson Street, Southwark, London, gave their steam cranes upright boilers, which measured externally 1·1 metres diameter, and 1·87 metres in height, and contained inside a round firebox of 0·91 metres breadth and 1·17 metres height. The last was traversed by two transverse tubes (à 20 centimetres each). Its heating surface was 4·3 square metres, the grate being one-seventh part thereof, and the plating which had to resist a steam pressure of four atmospheres, was of 10 millimetres thickness. Of the two safety valves one was held down with a spring weight, the other with a direct load exceeding 40 kilogrammes. The smoke issue was through a central tube which united and added strength to firebox and boiler cover; over the top of the latter it passed into a chimney with a slight conical enlargement upwards. The boiler was fastened to its iron feed water cistern.

The Reading Iron Works, Reading, Berkshire, sent drawings of a new system of boilers. Their nozzle boiler was a transverse tube boiler, the inner circular firebox of which passed above into a four-cornered tube chamber, in which a number of rows of narrow horizontal tubes, filled with water, intersected each other at right angles. In front of the openings of every line of tubes lay one common trough, the open side of which, turned upwards or backwards, regulated the direction of the stream of the water. Here the hot gases have to stream through the close reticulation of tubing, and do good service in their perpetual contact so long as the boiler remains free from deposit of ashes. In order to clean the inside of the tubes the upper part of the external cover has to be removed, which, on account of the connexion with the chimney passing through, involves a double process of unscrewing and the inconvenience resulting therefrom. A boiler of this description, with a

heating surface of 6½ square metres, weighs with foundation plate and grate bars 1,250 kilogrammes, or about 200 kilogrammes per square metre, and costs 94*l.* sterling.

Robey and Company, Perseverance Iron Works, Lincoln, exhibited an upright field boiler.

W. N. Nicholson and Son, Trent Iron Works, Newark, exhibited a series of small sized machines, with upright boilers of two to six horse power, 1·5 to 2·3 metres height, 0·76 to 1·00 metres breadth, and each containing a fire-box with two conical transverse tubes.

Heslop and Wilson, Lombard Street, Newcastle-on-Tyne, gave to their steam mortar machine (portable steam mill for grinding or crushing ore, fettling mortar, clay, chalk, or chemical substances,) an upright boiler, externally of 2·1 metres height, and 0·9 metres diameter, with the firebox of 1·5 metres height and 0·75 metres breadth. This contained two transverse tubes, 19 centimetres thick. The chimney of 25 centimetres rose up centrically out of the fire-box. The heating surface was calculated at 4·5 square metres, the surface of the grate almost one-tenth part thereof; the steam tension amounted to four atmospheres maximum, and the plates were 10 millimetres thick. It had only one safety valve.

Locomobile boilers. The extension which the portable steam engines called locomobiles, set immediately and inseparably on their boilers, have found in the short time that has passed since they were introduced is due in part to the convenient shape of their boiler. In most cases this differs only in the relations but not in construction from the locomotive boiler, and it has borrowed most of its details from its elder brother. In heating surface and the pressure of steam it remains still materially behind that, as is suitable to the minor effects which it serves to produce and the lesser weight that is conveniently admissible to transport on ordinary roads. But solidity, compact construction, low centre of gravity, small size with large heating surface, &c., appear to guarantee the continuance of the now existing form. It is true that the French principles of design already depart in more than mere matters of detail from the English, but the former appear to be declining, and the latter promise to become prevalent everywhere. Their difference consists in the use of circular fireboxes with circular cloak before the cylindrical tube boiler, in lieu of the flat walled heating space elsewhere customary, and adopted also in Germany and Austria. America did not send one single locomobile to the Exhibition. So much the grander was the position of England, whose leading firms in this branch of manufacture were all represented, and by their mere number shewed that it is they who have to supply the chief part of the requirements of the trade of the world. The English heating surfaces, grates, and other sections allow, as a rule, an increase of efficiency far beyond the nominal power. The French relations seldom or never admit of this, and the buyer must be contented with the guarantee of the amount of efficiency for which he buys the locomobile. The steam tensions, the thicknesses of plate being the same, are lower in the English than in the French boilers, and seldom exceed four atmospheres, but the last use double that pressure. Germany and Austria were very poorly represented in this section.

The English locomobiles. The boilers of the English locomobiles are all of the same construction and shape—the four-cornered fire-chest with a flat roof in a heat casing, which holds sideways a water space about seven centimetres thick, and is rounded semicircular at the top. Stays stiffen the side walls, and cross bars the cover of the fire. One firm sent fire-chests wholly welded. The cylinder boiler either passes over directly into the upper part of the heat casing, or in case this (by reason of the size of the grate) is broader than the diameter of the boiler, it joins with a corner iron ring on to the hinder wall, the "*crab.*" The rivetting is mostly done with steam or hydraulic machinery, and the points of junction are absolutely impermeable, even under double pressure. Iron tubes are always used, generally in vertical rows *in perfect order* (voll auf Fug), which in the fire-boxes are mostly, but not always, fitted with steel rings.

The cylindrical boilers are always covered with wood and metal, the heat casing is also very often so covered but the front end never. They all

work with the low pressure of 3½ to 4 atmospheres. The safety valves are always distributed (one in front with a spring weight, the other behind with a weight,) on the boiler. The release of steam is always regulated with a regulator lever and a valve inside situated on the steam cylinder casting, without one pipe coming outside. The feeding is done by a pump with three valves. Previous warming of the water is always adopted.

Competitive experiments of heating were not carried on in these nor in the stationary boilers during the Exhibition. In England they take place regularly with these machines, and have established the fact, that some firms manage with incredibly small quantities of coal, one kilogram per hour and braked horse, whilst others, with almost similar boilers, use five or six times as much fuel. Now, if in these experiments, as a matter of course, the management, the machine, the previous warming of the water, &c., come into the competition, we must look for the principal cause in two different modes of management known to the winners, but, it would seem, not yet to the losers in the trials. For the first, the locomobile is allowed to work with barely its precise nominal power, whilst the others are proud of double performance. This would, however, be possible also with the economical models, which have such large grates and such broad tubes (in cross section) that the forcing desired and compelled by the others would succeed with them equally well. But, when the generation of steam, and in consequence, the firing, is kept as low as possible, for the smallest power, where almost two square metres of heating surface go to one horse power, the proportionate consumption of coal is naturally diminished. In the second place, however, the tubes (in cross section) were too broad for the weaker heating, and then narrowed by inserted rings, just so that the flue pipe draws a minimum draught to the fire. This is ascertained by trials, carried on for weeks before the day of competition (of course with soft water in clean boilers) with the competing machines; and the diameter of the rings is settled down to millimetres of difference. Sometimes these rings must be put in front, at other times behind, in order to be most effective, *i.e.*, in order to stem the gases in such a manner that they receive the greatest accession of heat, but yet give the draft for the necessary production of steam. But now the direct heating surface of the firebox is large for slight heating, and the products of consumption are cooled when they enter the thin walled tubes. This ingenious contrivance has been described at much length, because it is quite applicable to the stationary boilers also, but it must not be presumed that other similar tricks, such as having less water in the boiler at the end than at the beginning of the trial, are carried on in the heat of competition, because these trials are under the management of very distinguished engineers.

But the English exhibitors united in the common agreement to enter on no competitive heating experiments at the Vienna Exhibition. This decision, though much to be regretted, was adhered to with the greatest strictness, and when some of the principals of factories wished to bring their locomobiles from the collection of their exhibits to the yard for isolated (not competitive) experiments in heating, this was forbidden by their Commission with full authority. The parties then sent for other locomobiles from England, with which the results (heating with straw) were obtained, that are recorded in their proper place in this report.

Clayton and Shuttleworth, Stamp End Works, Lincoln. The locomobiles manufactured by this firm are the most widely known in the world. Their workshops at Lincoln have turned out more than 13,000, and of the 4,000 locomobiles at present in Austria a good half comes from them. Adapted to the conditions of this place the fireboxes are uncommonly large in comparison with those of the other English models, in order to get larger heating and fire-grate surfaces. The construction is in all respects normal. The cylindrical boiler is joined by a corner iron ring on to the plate of the "crab" which is bent up against the side walls of the heat-casing, and by a second angle ring on to the larger smoke tube wall. This is also bent up in the outer circumference, and holds the casing of the smoke chamber. All rivettings are done by machinery, and hold absolutely close even under double pressure, without one single exception, as I often verified for myself.

The tubes are contracted (*i.e.* smaller in diameter) at the firing end, and expanded at the smoke end, which facilitates the removal of the incrusted surfaces, and preserves the wall of the tube. They are confined in front by a conical steel ring, and behind, projecting rather far, are left simply rolled up. The firebox cover is stiffened with beams, the sides with a normal system of stays, and from the wall of the heat casing from two anchor screws to four, according to size, pass through the whole boiler to the wall of the smoke tube. The foot of the chimney and the hoops and cover of the manhole are of forged iron. The maximum working pressure, as with the majority of English boilers, is four atmospheres. The heat surface in the eight-horse locomobile of this firm was about 14 square metres, or $1\frac{3}{4}$ square metres per horse-power nominal; the grate 0·52 square metres or $\frac{1}{27}$ of the heat surface, closing the section of the fire-chest of 0·8 metres breadth, and 0·66 metres length. In the cylinder boiler of 0·83 metres diameter are 30 iron pipes of 65 millimetres inside breadth, and 1·9 metres length, the entire cross section surface of which is precisely 0·1 square metres, or $\frac{1}{9\frac{1}{2}}$ of the size of the grate. The chimney is 0·29 metres broad, and occupies $\frac{1}{8}$ of the grate. The forward tube rings are 50 millimetres in size internally, which corresponds to a cross section of $\frac{1}{2}$ grate surface. But this narrowing to the small cross section is only local, six centimetres long, and has the same effect as the fire-bridge of a fixed boiler. The only leading feature is the unusual breadth of tube of almost one-fifth part of the grate. In connexion with the great specific heating surface such boilers are, by reason of this, easy to force, and as a draught tube fans the fire, they deliver sufficient steam for twice as much work as their nominal power reaches to. This can in fact, in this instance as with every other healthy organism, be done for a short time without any especial immediately dangerous strain, but naturally economy is best considered when the boiler is worked in moderation.

Ransomes, Sims, and Head, Ipswich. The most remarkable object exhibited by this firm was a locomobile for straw firing. The boiler itself had an inner firebox 0·92 metres in length and 0·79 metres in breadth, which gave a (combustion) section of 0·72 square metres. The cylinder boiler was 0·83 metres diameter, and 1·82 metres long, and traversed by 48 tubes of 56 millimetres clear breadth, making the fire surface 18 square metres, the grate $\frac{1}{25}$ part thereof, and the tube cross section $\frac{1}{8}$ of the grate. The straw heating apparatus itself, which is a joint invention of Messrs. Schemioth and Head, consists of a light plank table, at the end of which there is a pair of "friezing cylinders." One of the cylinders is moved by a strap in direct connexion with the shaft of the fly-wheel, and the other is taken with it by a cogged wheel. Now the stoker brings the straw on to the table, spreads it out and pushes it to the cylinders which seize it all, and give him time to fetch a fresh quantity of straw. A flat rectangular ornament on the head of the locomobile, rivetted between the firebox and the heat casing, offers a stoke hole, in front of which the apparatus is pushed, and through which the broad band of straw coming from the cylinders enters the furnace. The combustion takes place immediately, mostly during that space of time when the separate stems are still hanging down from the cylinders. Some few (four), deeper situated, longitudinal furnace bars prevent the unconsumed particles from falling out, and permit a loose scattering of the straw in the fireboxes for increase of power. From time to time the broad interval of space between these bars is cleared out with the teeth of a rake, which being moved to and fro beneath this grating removes the silicious ash which otherwise impedes the draught of air. Further, there is a narrow trap board over the feed cylinders, through which the process of the firing can be attended to. The tubes have to be frequently energetically passed through, and in order that the viscous ash may be brought out the "tube ferrules" are absent on the side of the fire. The heating can be done with wood, &c., or also equally with straw. Until the machine begins to work a worker has to turn the feed cylinders with a small handle, which is fitted on when the straps are taken off. The strength required for this turning is insignificant, but it occupies an hour and more of time if the boiler is cold. Underneath the fire-grate there is a receptacle for ashes which is open in front; in front of this there is a perforated water pipe running across. The feed pump can now from time to time scatter a distributed stream of

water over the always glowing ashes, and smother the danger for the fresh straw that lies round about. The chimney has a copper spark grating at the top with a cover, in this the small particles carried up get cool, and the larger are stopped and fall back down the chimney. On 16th August 1873, at the invitation of Mr. Head, I undertook a trial of this method of heating on the locomobile 2,688, with simultaneous measurement of water, and "brakeing" of the machine. The following are the results of this trial:

Weight of straw ascertained { in sheaves, 77 kilogrammes; loose straw, 100·5 „ } = 177½ kilogrammes.

The total quantity of water evaporated therewith, during the 45 minutes that the trial continued was 365 kilogrammes, reduced to 0 degrees, ... 330 kilogrammes. One kilogramme of straw therefore evaporates 1·86 kilogrammes of water at 0 degrees. The evaporating power of middling good coals being assumed to be 6·5, the relation of the heat production of straw to that of coal, weight being the same, is as 1 to 3·5. The so-called 10-horse-power locomobile was braked on the "ring of the main brace" (Qy.: of the fly-wheel) with a pressure, kept constant, of 70 lbs. English, and number of revolutions, kept constant, of 140 per minute, 18·6 horse power. Per hour and per horse, therefore, the quantity of straw consumed is 12·6 kilogrammes.

In Russia, we hear there are already many of these apparatus at work, and it is calculated that the consumption of eight to nine sheaves for fuel threshes 100 sheaves. By a simple process of calculation based upon local prices, the utility of this fuel can be estimated. In general, where the price of good coals is fourfold that of straw, the burning of straw is much more profitable than its sale, if firing is used. In cases when the use of wood or coal is to be resumed, the apparatus can be removed from the boiler, a door put before the crevice, and ordinary grating bars having been supplied to the furnace, the heating can be accomplished in the ordinary manner.

With respect to the other locomobiles (boilers) of this firm, we have still to notice that those for expansion engines were provided with two pumps, of which one raises the cold water into a reservoir in the smoke box, where it is first warmed up to almost 100 degrees Celsius, and then forced into the boiler by the other pump. A considerable saving of fuel is effected by this preliminary warming of the feed water.

R. Garrett & Sons, Leiston Works, Suffolk. A substantially new object exhibited by this firm was also a locomobile for heating with straw. The boiler itself consisted of a fire box of 0·70 metres breadth, and 0·60 metres length, from the back wall of which 28 tubes, each of 60 millimetres breadth, passed to the smoke box. The heat surface of the so-called eight horse-power boiler is thus 12·5 square metres, 1·55 per horse power, the size of the grate is $\frac{1}{30}$ part of the heat surface, and the cross section of tubes $\frac{1}{12}$ part of the grate. The tubes are pressed into the firebox without supports, which is necessary with straw fuel for cleaning, and first adopted by this firm. The apparatus for the straw heating is the simplest conceivable, and consists of a large cast-iron funnel (or upright tube) which is placed under the ordinary firebox door on the boiler front, and opens into the heat space (firebox). The firing is now carried on by the regular introduction of large loose bales of straw through the funnel, by the help of an iron fork. One ordinary labourer is quite sufficient for this work, and as there is no machinery, the danger of an accident is obviated at once. The straw bale in the firebox burns free in the air, whilst the end of it, at the same time preventing a wrong draught, is still held behind in the funnel. As it falls down, the lightening of the tube gives the stoker the signal to fill up afresh. The stems burning down are held by three or four bars on the bottom of the firebox until they fall into the ash space underneath. The firebox door over the stoke-hole permits an occasional clearing from the interior walls of the cobweb-shaped glassy slag that is peculiar to the burning of straw. Through these firebox doors, it is also possible to heat up with coals, when ordinary gratings have been laid in the firebox.

On 6th October 1873, at the invitation of Herr Paul Kotzo, the general agent of the firm, I undertook a trial of heating with simultaneous measurement of water and brakeing with such a locomobile. The results of this

trial, which lasted 58½ minutes, were as follows: ascertained weight of straw 163 kilogrammes, water evaporated therewith 380 kilogrammes, reduced to 0 degrees, .. 321 kilogrammes. One kilogramme of straw therefore evaporates 1·97 kilogrammes of water at 0°. The evaporating power of middling good coals being assumed to be 6·5, the relation of the heat production of straw to that of coal, weight being the same, results as 1 to 3·3. This so-called eight horse machine was braked on the *Eaton* brake sheave with addition of half horse power for friction of the apparatus—16 horse power. The steam during the experiment sank from 72 to 60 lbs. English, and the revolutions per minute from 140 to 120. Per hour and per horse, therefore, the quantity of straw consumed is 10·44 kilogrammes.

I have still to add that the feeding funnel has a cover to open and shut, with which the fire space is closed in the intervals of rest, and the chimney has a net to catch sparks, but no metal cover. The necessity for a metal cover however was proved by a number of holes burned in my clothes.

In Hungary, we hear that there are already many such straw heated locomobiles at work to the satisfaction of those that use them. The letter of one landed proprietor records, from his own experiments, results still more favourable than those that I arrived at, which may perhaps come from the bad quality of the coals used in the comparison. A further peculiarity of Garrett's boiler is a "stream-fore-warmer," that is, a concentric collection of the stream of water returning to the feed water "kibble" during the vacuum stroke of the pump, with a part of the escaping steam. By the heating of the feed water up to 60 degrees a perceptible saving of fuel is in this manner effected.

John Fowler and Company, Leeds, and 71, Cornhill, London, have boilers for their steam traction engines, almost of normal construction. In one of them (No. 2,001), the firebox measured 0·60 metres breadth, 0·79 metres length, and through the cylinder part of 0·74 metres diameter there passed 22 tubes each 66 millimetres broad, and 1·7 metres long. The heat surface was therefore 11 square metres, of which $\frac{1}{28}$ part was the grate, the tube cross section being $\frac{1}{14}$ of the grate. It worked with about seven atmospheres as highest pressure, and its cylinder part was formed of metal plates of 8 millimetres thickness.

Aveling and Porter, Rochester, Kent. For working street rollers and steam cranes, this firm use locomobile boilers, which differ in many respects from the normal system of construction. Unlike the locomotive boiler this has to serve as an organic part of the traction machinery, and a substitute for the frame. For this purpose the plates of the sides of the exterior heat casing are particularly strong, 14 millimetres, and project over the boiler upwards and backwards. These plates bear four cornered notches on the top for the crank axle, and behind are bored for shafts of wheel work. The exhibited boiler of an eight ton roller (locomobile No. 900) had a firebox of 0·50 metres breadth, 0·66 metres length, and 0·80 metres height; it contained 24 tubes, each of 46 millimetres clear breadth, and 1·1 metres length. The heating surface results therefrom 5·8 square metres, the grate 0·33 square metres, or $\frac{1}{17}$ to $\frac{1}{18}$ part of the heating surface. The tube cross section of 0·04 square metres covers $\frac{1}{8}$ of the grate. The plates of the cylinder were eight millimetres thick, and the steam tension equalled 6½ atmospheres. Another similar boiler (No. 959) has to work with eight atmospheres. The firebox plates were bent outwards below and riveted with a corner iron to the outer casing, &c.

R. Hornsby and Sons, Spittlegate Iron Works, Grantham. The locomobile boilers exhibited by this firm are distinguished by the excessive height of the heat casing, the plates of which enclose the steam cylinder. A locomobile manufactured by this firm (No. 2,359) worked, with pressure of four atmospheres, the repairs workshops of the Exhibition. The firebox thereof was 0·66 metres broad, 0·40 metres long, and traversed by 26 tubes, each of 50 millimetres breadth. The heating surface calculated from these data results at 9 square metres, whereof the size of the grate is $\frac{1}{14}$ part. The tube cross section was $\frac{1}{15}$ of the grate. The levers of the safety valve, bent into an S, and almost half a metre long were singular, the cover was painted fiery red.

The Reading Iron Works exhibited locomobiles which had no rivets at all in the firebox, the low moor plates being all welded. The cylindrical smoke chamber casing was double, and in the space between the feed water was warmed up to 100 degrees Celsius. It is stated by the firm that a successful result of a competitive trial (1·08 kilogramme of coal per hour per horse) was chiefly due to this preliminary heating of the water.

Stephen Lewin, Poole, Dorsetshire. His locomobile was remarkable for the "scandalous roughness" of its construction.

Robey & Company, Perseverance Iron Works, Lincoln. The patent locomobile boilers of this firm have the side walls of the firebox prolonged below the grate and ash box, and the water space reaches horizontally still below that. In this very deep and large space, exposed to no more heat, sediment and gravel collect, and are easily blown out through the tap. By means of this contrivance, the hot plates seem to be protected to some extent from damage by bad water, for which this boiler is intended. The opening of the firebox door was altogether obtained by the front plate of the firebox driven out, and the ashpit opened with a hinge. The heading was flat and of course strengthened with stays. The arrangement for preliminary warming of the feed water and other details of construction were the same as those of the majority of the rest of the locomobiles.

Ruston, Proctor, and Company, Sheaf Iron Works, Lincoln. The locomobiles of this firm displayed the good proportions common to English boilers. A sufficient heat surface 2·0 to 1·8 square metres per horse power, the grate $\frac{1}{10}$ part of the heating surface, and tube cross section $\frac{1}{2}$ of the grate. A 10-horse boiler (No. 2,937) had a firebox 0·87 metres broad, 0·68 metres long, and 32 tubes, each of them 72 millimetres wide, and 2·13 metres long. The heat surface results therefrom at 18 square metres, and the proportions are those mentioned above. These boilers are only constructed for maximum pressure of $3\frac{1}{2}$ atmospheres, which the plates, eight millimetres thick, of the cylinder 0·84 metres wide are thoroughly capable of supporting. The lever of the front safety valve is of bronze, and the direct weight on a second safety valve hangs inside the boiler.

Other locomobiles were exhibited by Marshall, Sons, and Company, Gainsborough, Lincolnshire; E. R. and F. Turner, St. Peter's Iron Works, Ipswich, with a stream of water fore-warmer, like that of Garrett; and Woods and Company (Woods, Cocksedge, & Warner, Suffolk Iron Works, Stowmarket).

MACHINERY AND APPARATUS APPLIED TO POTTERY.

Report of Dr. Emil Teirich, *Member of the International Jury.*

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Machines for the preparation of raw material, or for modelling it in the manufacture of pottery, and the arrangements and apparatus contrived for burning and glazing the objects modelled, are to be our subject of consideration. But we must at once remark, and express our strong regret, that the Vienna Universal Exhibition showed, in comparison with its brilliant collections of finished goods, comparatively little in this province of manufacture, and that, among the objects that were exhibited, there was very seldom anything quite new to be found. That which was most remarkably wanting was the most important and the most interesting. This remark is especially applicable to those machines that have of late been brought into use by the English manufacturers of tiles on Prosser's process, and for the manufacture of the German, so called Mettlacher, paving tiles; it applies further to the various potter's lathes for round and oval forms that are used in French manufactories to the best advantage as plate machines; and also to many kinds of turning lathes, and similar apparatus for working the raw modelled and almost entirely dried clays that are brought extensively into application at the manufactory of Doulton, of Lambeth. The newer kinds of

English tube presses for great diameters and for the manufacture of shaped nozzles, which are worked by direct pressure of steam, or those very ingenious hydraulic tube presses which we saw in operation a short time since in one of the largest manufactories in England, as Clark's patent, were not in the Exhibition, any more than Clayton's well known contrivance for the same object.

In fact nearly every apparatus that has been recently introduced and applied by the English manufacturers was absent altogether, like those of Clayton, already named and well-known, Whitehead, and Kirk and Pollock. It is more common in the manufacture of pottery than in most other branches of industry for supplementary machines to be constructed for special objects, and the secret of them anxiously preserved. To collect or discover what there was, however, in the Exhibition was no easy task. All the objects that we have to deal with were distributed among the most varied groups, and over the whole extent of the Exhibition, so that if there are any omissions in our report it must not be made a reproach. The whole of the material could only be collected to a certain extent by accidental discoveries. In order to reduce to order what we thus discovered we propose to deal in order with:—1. Machinery intended for the preparation of the raw material. 2. Machinery and contrivances used in modelling the clay. 3. Apparatus for drying and baking the modelled objects.

Machinery for preparation of the Raw Material.—Rolling mills are less used in Germany and Austria than in England as machines for the preparation of clay, especially in the manufacture of fire-proof bricks. They are also very effective in the pulverisation of the very dense fire-proof clays, fire-bricks, and quartzes, and for the mixture of all these materials in a damp state. The newer sort of rolling mills with fixed rollers and rotating table slabs have the advantage of an easier motion and greater convenience of manipulation, which can be carried on at every part of the table undisturbed by the ordinary rolling stones. The power used to produce motion is less, the centrifugal force of the rotating stones is avoided, and does not prevent the machine being set moving at a greater speed than could be given under the old system of construction: and the amount of work done by the newer system is in consequence much greater. A good arrangement and support of the rotating slabs by guiding rollers are the principal conditions of efficiency. The Exhibition, however, showed scarcely any specimens of such rolling mills, at least none constructed especially for the pottery manufacture, though the portable apparatus shown by Heslop and Wilson, of Newcastle-on-Tyne (portable steam mill for grinding or crushing ore, fettling mortar, clay, chalk, or chemical substances), might be used for the purpose. The rolling mill with its iron crushing rollers and fixed slabs stands on one foundation, which is mounted on four railway wheels, and is set in motion by means of a communicator by the direct action of a small steam engine combined with a fixed boiler. The entire arrangement is extremely compact, and yet this close proximity of the steam engine to the rolling mills, susceptible as the former is to dust and dirt, could only be advisable in very rare instances. The access to almost all the parts of the machine is interrupted, and the spaces left for feeding it with the raw material and removing the same after passing through the process are very confined. Such an arrangement is best adapted for cement making and kneading concrete for building purposes, in which the facility of locomotion of the whole apparatus is much in favour of this in other respects unpractical construction.

For the pulverisation of materials for glazing before they come to the grinding mill there were no rolling mills exhibited. The disintegrator which was exhibited in its original form of construction by Carr, at the Paris Exhibition, has proved well adapted for the pulverisation of quartz and fire-brick, and has also been used with remarkable success as a machine for working up moistened clay. This highly interesting apparatus consists of two or three horizontal drums, one inside the other, the peripheries of which are studded with spikes of wrought iron, or, for working very hard material, of steel. Each of these drums revolves with considerable speed, but always in

a contrary direction to the one next to it. The material intended for pulverisation is introduced in the direction of the axis of rotation, and, beaten to fragments by hundreds of blows, passes through the peripheries and comes out in a very short time into the space between them and a casing which encloses the whole apparatus, from which the pulverised material is ingeniously removed by a chain pump (paternoster). The power which this machine requires to set it in motion is considerable, and the wear and tear of all its parts very serious, but the quantity of work that it does is quite astonishing. This excellent apparatus, which, especially in the manufacture of pottery, has been hitherto too much neglected, has been strengthened and made more durable by a number of improvements, especially directed to the arrangement of the supports of the heavily strained cylinders. By an enlargement of the diameter of the drum it has been contrived to reduce the number of revolutions of the cylinders, but the largest disintegrators hitherto constructed, which are 1·500 metres in diameter, still make 400 to 550 revolutions, and this requires the enormous circumference speed of 30 metres. For such work it is easily conceivable that the apparatus requires 15 to 20 horse power to propel it, but it then produces 20,000 kilogrammes in the hour, even with very hard material, for it differs from other machines for pulverisation by grinding down most easily the hardest bodies. Disintegrators of the dimensions that have been hitherto most frequently used, of one meter diameter, working with 7-horse power, pulverise an average of 7,000 kilogrammes of raw material to powder of a remarkable degree of fineness. The disintegrator can be used to excellent advantage as an apparatus for mixing different varieties of clays; also for a preliminary preparation of dry clays for other machines or for brick presses which have to mould material containing moisture from the earth. Calcareous or rubble stone earths especially are cleaned in this manner cheaply and effectually, or the extraneous ingredients so thoroughly distributed that they become harmless in the whole of the mass. The disintegrator, however, is as yet hardly introduced into the German pottery manufacture; but in England it is otherwise, and there it has already come into frequent application. We have seen it working to the complete satisfaction of the manufacturers at the works of Gibbs and Canning, of Tamworth; G. Jennings, of Poole; Perrens and Harrison, of Stourbridge; Ensor and Sons, of Burton-on-Trent, and Cliff and Sons, of Leeds.

Stone Breakers.—In all the stone breakers that we have noticed above we find the original system of Blake in application, in which one jaw swinging from a fixed pivot of suspension is driven by an eccentric movement against the other, which is immoveable. But the stone breaker constructed on Archer's patent (England) works in quite a different manner. A horizontal, rotating, case-hardened cylinder is about half covered by a forked claw of the same breadth, made of strong cast iron, and ribbed internally, which oscillates about an axis which is a little above that of the cylinder but parallel to it, in such a manner that between the claw and the cylinder there is a broad space above and a narrow space below. This arrangement with respect to the cylinder permits of the introduction into the broad space between the claw and the cylinder of the material that is to be broken; the cylinder takes it along with it in its revolution to the other end of the claw, which is in closest proximity to the periphery, and in the meantime the pieces are rapidly reduced in size. The apparatus is exceedingly effectual and rapid in its work. Unfortunately there is a difficulty in the replacement of the worn out parts, and the construction on the whole is very apt to suffer breakage when the materials with which it is fed are too irregular in size. This stone breaker was only represented at the exhibition by a sketch, but it has been brought into practical use in many places.

Machines for giving Shape.—Brick-making machines, in practical application as well as in the Exhibition, are the most prominent of contrivances for moulding clay. We have already remarked that this year brings forward little that is new in this province, especially were there no new principles and elements of construction to be seen in the machines. Germany sent the most exhibitors in this branch of machinery manufacture, but the brick-making presses from Germany showed no material variations from those

that were shown in the Exhibition of Paris in 1867. England sent two brick-making machines to the Exhibition, Austria and America each one. These may all be generally divided into two principal types. In one, the clay prepared by a cylindrical arrangement, or a "malaxator," or by both together, passes at its issue from the clay-cutting apparatus through a mouthpiece, in which it receives a symmetrical funicular mould, and is then cut up into regular lengths, forming bricks, by a cutting contrivance. In the other it is shaped in moulds placed underneath, which are emptied by hand or machinery. The first system is chiefly characteristic of the German and Austrian brick-making machines; the last is adhered to, as it has been for years, with great tenacity by the English and Americans. The machines of Gregg of Philadelphia, and of Pollak of Leeds, which attracted so much attention, the former in Paris, and the latter in London in 1871, are of this latter type, and are the prototype of their species; they were neither of them exhibited in Vienna this year. Unfortunately their use is confined to the working of a poor sandy material. A fat clay, such for instance as that which is worked in the Vienna brick-fields, fills up the moulds too imperfectly, and produces excessively heavy bricks, which are even harder to work upon with the bricklayer's hammer than these produced by the German kneading machine and cutting table. Machines for working with perfectly dry clay, such as are still in partial use in England, have not been able to obtain a footing here. All the brick-making presses exhibited in the Prater were intended for working earthy, moist, or reticulated clay.

Morand's patent brick-making machine, exhibited by T. S. Derham, of Leeds, belongs to the category mentioned at the beginning of our remarks. It consists of a vertical clay cutter which is propelled from above by a worm wheel. This work, and the turning at intervals of the round horizontal moulding table which contains the impressed brick moulds, is done by two obliquely placed steam engines mounted on each side of the frame of the whole machine. The bottom of the brick moulds is moveable. It is of the shape of a stamp, having a small roller at the lower end which runs on a slanted plane. As the table turns round the mould is brought under the mouthpiece introduced into the bottom of the clay cutter; it is then filled as its stamp stands at the lowest point at the beginning of the slanted plane, that is, laid round in a circle. But, as the table turns on, the bottom of the mould is lifted up by the running up of the little roller on the slanted plane, this pushes out the brick, which is already pressed and finished. Another contrivance carries it off on to an endless band from which a workman removes the finished goods. The machine is also constructed without direct steam engine motive power, and probably we should be more pleased with it so. We have several times already had occasion to condemn this certainly compendious mode of construction, and are forced to do so again. The application of the power by a worm wheel and endless screw is however in this case also a waste of labour. So far as it is possible to judge the machine works with precision, and it may have no other disadvantages than those which are almost inseparably connected with the system of its construction. Above all, the great wear and tear of the moulds, and the considerable consumption of lubricating materials that is required to keep all the parts in proper working order, are what have to be considered in this case. Another especially unpleasant characteristic of this machine is the difficulty that exists of altering the mould of the bricks, for which new moulds in the moulding table and naturally also new steel stamps would have to be made. Whether the leather arrangement for driving the table is in reality a protection against breakage if a hard stone comes between the aperture of the clay-cutter and the rotating table must be learned by experience. Everything is being rubbed, and forced, and squeezed in Morand's machine, and thorough extensive repairs must in a short time become inevitable. The bricks that it makes are however a very good specimen of manufacture, equal to those made by hand, sharp at the edges, and fairly homogeneous in the fracture. The variation of the properties of the clay, so long as it be not altogether too fat, will have less effect on this machine than on many another of similar construction. Its price, inclusive of steam power, is 4,500 florins; without steam power, 3,500 florins, on the spot in England. The work done by such a press with the

application of so-called eight-horse power—to judge by the dimensions of the cylinders used it should rather be called 15 horse-power—is 1,200 to 1,500 bricks in an hour, assuming the moulding table to make four revolutions in a minute.

Pipe making machines.—The press exhibited by E. Page and Company (Victoria Iron Works, Bedford), offers no more novelty than those that we have mentioned above. The clay is driven out by a double rack, and the power is transmitted by a strong double communicator. Four drain pipes are produced at one operation. These machines are gradually becoming obsolete for drain pipes, and are giving place to machines that can be kept in continuous activity. The manufacture of stone pipes, which was introduced from England to the continent, and has been carried on here, but more especially in Germany, for a long time with success, is continually gaining in popularity and becoming more and more domiciled in Austria, which exhibited some very fine specimens of this class of goods. What is aimed at in general is the production of well formed, dense, impenetrable socket and nozzle-pipes, and machinery has been in operation in England for a long time by means of which the socket and nozzle can be pressed with the pipe at one operation The machine of H. Clayton drives a piston by a double rack into the cylinder filled with clay, and in this way presses out the strong pipes, after the socket and nozzle have been formed in their peculiarly constructed mould. This is certainly the machine that is most generally known, and it served at first as a substitute for the hand labour by which even at present the sockets are still frequently formed in England, with the help of the potters lathe, or by cementing larger pieces of pipe to the ends.

Even more interesting than this contrivance of Clayton's is that which we saw in operation at the manufactory of Gibbs and Canning at Tamworth, which works by hydraulic pressure. The socket and nozzle in this case are moulded after the pressing of the pipe is completed, and are homogeneous to the whole mass. None of these machines, which are not in constant activity, were exhibited in the Prater.

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SURGICAL INSTRUMENTS.

Report by Dr. Mosetig v. Moorhof; Dr. Hans Adler; Dr. L. Schroetter; Dr. Moriz Benedikt.

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Lithotrity.

In apparatus contrived with locks, we found along with the old "écrou brisé" of Leroy d'Etrolles, with a turning slide, many more practical and convenient arrangements for opening and shutting the broken screws, *e.g.*, the pressing slide contrivance by Thompson, of England, in which the screw is closed by sliding the button forwards, and opened by sliding it backwards, &c.

Polypus uteri. For the safe and accurate seizure of neoplasms whose boundary lines of insection do not lie in one and the same plane a "pince à branches glissantes" was exhibited by Greenhalgh, England; of which one arm can be shifted on the lock forwards or backwards, without in the least disturbing its prehensile efficacy. The construction of the pincers in other respects is analogous to those of Museaux.

Tonsillotomy.

A second variety is the tonsillotome of Morell Mackenzie of London. This instrument, like the old guillotine for cutting the uvula, consists of a

broad metal plate furnished with oval-shaped windows in front, and meant to take up the tonsils. In the "salt-like emarginated" (salz-artig eingekerbten) edges of the plate there works a knife, uniform in breadth and ground sharp in front, and above this there is introduced a fork, which can be shifted, for seizing and drawing forward the gland. With this apparatus the tonsil is parted through from front to back, whereas all the other instruments perform the operation in the contrary direction from back to front. We discover no particular advantages in this instrument.

Aurists' Instruments.

Rein and Son (England) exhibited sound condensers for the deaf in all varieties.

Invalid's chairs for propulsion by the pushing of others or by the invalids own agency were exhibited in most excellent variety by Ward (England), and Lipowsky and Tischer of Heidelberg.

Bandages.

In bandages for fractures of the thigh and groin, crural and inguinal ruptures, Spillmann of New Orleans, Salt of England, and Rasmussen exhibited some novelties, which enable them to dispense with the troublesome "thigh straps." The pelvic spring is curved accurately into the shape of the pelvis, and does not have the "pelotte" at its foremost end, but this is supported, in Rasmussen's instrument, by a clasp placed perpendicularly downwards, and in Spillmann's instrument by two clasps arranged to form a triangle. The pelvic spring fits close into the pelvis, and never goes beyond the horizon of the pelvis; it therefore undergoes no disturbance from movements, because the plates of the hip bones and the trochanters prevent this. The required adjustment of the "pelotte" is provided for, in the apparatus of Rasmussen and of Salt, by a powerful adjusting screw with a spring; and in the apparatus of Spillmann, by other mechanical contrivances which cannot easily be described without drawings.

Artificial limbs were very plentifully exhibited, the most prominent of the countries exhibiting being England (Gray), France, Italy, Switzerland, Germany, and Austria. The materials of which the artificial upper and lower extremities were manufactured were wood, leather and hard gum (Hartgummi). The motion of the joints was provided for by india-rubber bands or catgut strings. The weight was reduced to the minimum; and complete femurs weighed altogether only three pounds. Weber Moos has discovered a new mechanism for the imitation of the movement of the hocks (of horses) in artificial legs. It is kept secret, and all that I was able to learn about it is, that it consists of an ingenious combination of two india-rubber cylinders and "chain joint" of extremely simple construction.

Dentistry.

Artificial teeth and jaws of excellent material and exquisite beauty were exhibited from America (S. White, H. Justi, and Allen), and from England (Ash). Dentist's instruments: pincers, borers, stoppers, &c. (all of them nickelled), were exhibited in many new and improved designs by S. White and Ash. These surpass the instruments exhibited at the Paris International Exhibition, chiefly in external finish and great variety. We would call especial attention to the novelty of the instruments for nerves of teeth (Zahnnerveninstrumenten) of Palmer and Arrington. Dentists' operating chairs were exhibited by S. White, O. C. White, and Ash, and in the German gallery.

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MUSICAL INSTRUMENTS.

Extracts from Report by EDUARD SCHELLE.

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The organ had, in the 10th century, already made remarkable progress, especially in England, for, by the narrative of the Benedictine Wolstan, we are told that there was an organ at Winchester in the year 951 which contained no less than 400 pipes, a remarkable number at that period. The work was certainly of a primitive kind, for it had as many as 26 bellows belonging to it; to give sound to the pipes and to set these 26 bellows in motion was work for 70 strong men:

PIANOFORTES.—The English department was at great disadvantage from the absence of Broadwoods and Collards. England sent 12 pianofortes to the Exhibition.

The mechanism of the hammer was introduced into England by the Swiss Burkhard Tschudi, who erected a manufactory in London. He made this over to his son-in-law John Broadwood, whose name is used to this day by the largest firm in England. A workman of this manufactory, a German of the name of Becker, applied this mechanism to the harpsichords or clavichords then common in England. The "stosszungen" had been already invented by the firm Longmann and Brodesip; the damper separated from the hammer had been discovered by an Irishman.

From these beginnings was gradually developed the system that is now known as the English mechanism, and John Andreas Stein is the proper author of the German mechanism. The latter differs from the English in the respect that it places the hammer on the lever of the key immediately, whilst the English mechanism separates the hammer from the key by an intermediate leader to which it is attached. On the first again at the hinder end of the hammer shaft there is a "jib," which, when the key is pressed down against the loosener, strikes a knee-shaped wooden spring which throws up the hammer; but, on the other system, the hammer is thrown up by a "*stosszunge*" fitted on to the end of the lever of the key, which is also the loosener. This contrivance of loosening, by means of which the "stosszunge" is pushed out from the hammer machine, so that the raised hammer after it has struck the wire can recover its original position without hindrance from the wire, is also an English discovery. The mechanism of the English manufacture was substantially improved by the so-called repetition mechanism (double échappement) introduced by the celebrated factory of Erard in Paris, an arrangement by which the advantage is obtained that the hammer, after impact and release, does not return to its original position, but strikes again on the wire upon the lightest touch by the finger upon the note. How greatly the system of Erard in its numerous variations now prevails is evident from a glance at the instruments sent to the Exhibition. We must content ourselves with this glance, which is only to help to an appreciation of the exhibited instruments. The history of piano manufacture unfolds a wealth almost without limit of combinations and experiments of every kind, and we see all these efforts tending to one object, to make the tone of the piano as large and "cantabile" as possible, in a word, to carry the resonance of the instrument beyond the limits apparently natural to it. Quite in the spirit of this tendency, Streicher, in 1823, adopted the system of Panteleon Habenstreit, and constructed a mechanism with the hammer blow from above, to the elaboration of which the ingenious manufacturer Henri Pape, of Paris, devoted a great deal of industry; Roldur, of Berlin, and Wornum, of London, have since taken up the same principle, but without obtaining popularity for it.

England ranked next to France, if the rank is determined by the number of instruments, but, judged by the list of manufacturers, England was uncommonly badly represented. Only two firms, Kirkmann and Henry A. Ivory & Co., of London, entered the lists for the honour of their country. Kirkmann exhibited altogether nine instruments: 1 large grand piano; 2 drawing room grands; 1 upright grand, all with straight wires, the last with

iron frames; 1 oblique pianino; 4 upright pianinos. The grand pianos are characterised by a "cantabile" well modulated, but not very rich in tone. The upright grand is the most in accordance in tone and touch with the requirements of the period, but the damping might advantageously be made more precise. The pianinos also on the whole are very meritorious samples of manufacture. The manufactory of Ivory & Co. sent three pianinos, among them one with embroidery. The last is the only valuable part of these productions.

Most excellent bells, eight in number, were exhibited in the English department by the firm William Blews and Sons, of Birmingham.

Parts of musical instruments.—The best felt was that exhibited by the firm R. R. Whitehead Brothers, of London, in the English department. It far surpassed in quality the American felt exhibited by Alfred Dolge, of New York.

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SANITARY ARRANGEMENTS AND VOLUNTEERED HELP IN WAR.

Report by Dr. Mosetig von Moorhof, *k.k. Primararzt und Universitaetsdocent.*

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The sanitary pavilion of the Universal Exhibition contained contributions from Bavaria, Denmark, France, Austria, Prussia, Sweden, Switzerland, Spain, and Wurtemburg; Russian sanitary objects were exhibited inside the Hall of Industry. It was remarkable that most of the objects were contributed by societies or individuals, whilst the War Ministries of different states, with the sole and honourable exception of Russia, had sent either very little or nothing at all. With regret we missed England. The societies of that country had promised their participation in the exhibition originally, but the General Direction were so long in hesitation about the carrying into effect of the suggestion of an especial sanitary exhibition, that the English societies grew tired of waiting for a decision and withdrew their intended contributions.

Cooking carriages.—These are a modern invention introduced in America during the recent war. Europe is adopting them now, and although they are still eyed askance like all novelties, it may be hoped that they will soon become generally popular. In England ambulance kitchens are already constructed for workmen employed in factories or the open country at a distance from their homes, providing these men with good and healthy food at a moderate cost. A man's working power is regulated by the activity of his animal functions, and this by the quantity and still more the quality of the nourishment he receives. To neglect to provide substantial food suited to the labourers' constitution would be a blunder in national economy that the practical English are careful to avoid. The colony of English artisans settled in the grounds of the Universal Exhibition were catered for during the whole time of the exhibition cheaply and well by means of a cooking carriage, a proof of its usefulness and goodness.

A cooking carriage in general contains one or more completely fitted cooking ranges, set on a carriage which must further have space to carry provisions and fuel. The cooking pots must either not be made fast to the range, or at least be fixed in such a manner as to prevent their contents from being jolted out during the journey. The chimney must be of a height sufficient to overtop the head of the cook who stands before the grate, and higher than the indispensable carriage roof. The cook must be able to stand in front of the grate or behind it, it is better if he faces the direction of the carriage and stands behind the grate, but if there are several cooking ranges he must in no case be put between them; he would not be able to endure the heat. The cook ought to be the stoker of his own fire. The

cooking carriages are constructed of various sizes adapted to their object, and as they have to be regulated in weight by the same condition they require four horses on occasion. Smaller carriages are drawn by a pair of horses, and some even by one horse. The following specimens were exhibited in the pavilion:—Catalogue No. 30, Richard Adams, Strutton Ground, Westminster. A kitchen for workmen, the "British Workmen's Hotel," and a smaller model, both the property of His Excellency the General Director of the Universal Exhibition, Baron Schwarz von Senborn. They are constructed of iron, four-wheeled waggons with a waggon roof, and made to be drawn by one horse. They contain each a cooking range divided into various compartments, and a space behind the range for the accommodation of the cook and a coal box.

Winter Barracks.—The model exhibited under Special Catalogue number 58*a*, may be regarded as the acme of beauty and convenience of arrangement. This closed winter barracks was constructed from the design of Her Royal Highness the Crown Princess of Germany, the Princess Royal of England, in the year 1870, at Homburg. It rests on a brick foundation, and is provided admirably with every requisite that we have mentioned above. Nevertheless the position of the windows is, in our opinion, too low. The air ought to stream in above the heads of the patients on to the bedsteads of the same elevation.

Apparatus for performing operations on the limbs without the effusion of blood. Professor Esmarch exhibited an elastic roller bandage and an india-rubber sheath of the thickness of a man's finger: two apparatus of the greatest importance for surgery in peace and war. Since their introduction almost all operations on the extremities are carried out by a bloodless process, and finger compression as well as the tourniquet is now superseded by the india-rubber sheath. Esmarch's idea was to make the part operated on quite bloodless, and keep it so until the operation was completed. The mode of application is as follows:—The extremity to be operated on is tightly bandaged from the fingers or toes upwards by elastic rollers, up to and beyond the part to be operated on, whereby all the blood is driven back to the trunk. Then the india-rubber sheath is tied round the limb tightly, and close to the last turn of the bandage, and compressed to such a degree that arterial blood cannot enter the limb until it is taken off again. By this double process any limb can be deprived of blood and all operations calmly and quietly performed without disturbance from hæmorrhage. The removal of the india-rubber sheath instantly restores the normal circulation of the part. It has been established experimentally that the circulation can be suspended for 40 minutes in a limb without injury to the limb, nor is the healing process of the wound disturbed thereby. This Esmarch process is not new in principle, though it is in the manner of its execution, and it is applicable to all operations involving the effusion of blood which are performed on the limbs below the shoulder or hips. It is only objectionable in the case of purulent or watery infiltrations of the flesh, because the concentrated pressure might drive back the pus and ichor into the circulation along with the blood. But the india-rubber sheath alone is always and in all circumstances the best compress for the temporary suspension of the circulation in a limb. It is of course not adapted for compression of the arteria sub-clavia or iliaca.

Cripps of London has introduced a modification omitting the roller bandages, and using nothing but the india-rubber sheath for both purposes. The limb is bound round at the extremity with five or six turns of the elastic sheath, and each turn of the elastic is then rolled over gradually one over the other until the part to be operated on has been passed. It is evident that the blood is by this means gradually pressed back and the effect of the roller bandages completely substituted. But whether this process is simpler than that of the elastic bandage is à priori doubtful.

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MILITARY ENGINEERING.

Report by JOHANN LAUER, *Imp. Royal Captain in the "Génie" Engineers.*

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BLASTING OPERATIONS.

Material for blasting was represented in counterfeit in the second group by imitations of gunpowder from several German and Belgian firms and the Italian War Ministry; of a blasting substance from Genoa; and of gun-cotton from Prentice at Stowmarket; also of dynamite from Nobel & Co., of Kruemmel, near Hamburg, and Zanky, near Prague.

Gun-cotton, discovered at Basle in 1845, by Professor Schoenbein, is not an accidental discovery, but the product of a series of investigations into the changes that vegetable substances undergo under the influence of strongly concentrated nitric acids. Soon after Schoenbein, Professor Boettger of Frankfort, made the same discovery, and both gentlemen offered their invention to the German "Bund," which, however, laid down conditions that made it probable that the discovery would be left a long time dormant. But this was prevented by Professor Ott, of Brunswick, who made known that he had succeeded in obtaining a preparation which agreed in every respect with the gun-cotton described by Schoenbein. The difficulty that attended the process of preparation was simultaneously overcome by Hopp, of Leipzig, and Karmarsch and Heeren, of Hanover, who showed that a mixture of acid consisting of the sulphuric and nitric acids of commerce was excellently well suited to the process sought. None but a skilled chemist could produce even a small quantity of gun-cotton, its wholesale production by manufacture was still a long way off. It is to the member of the commission for examination, convoked by the Bund, to K. K. Artillery Captain, now Field Marshal Lieutenant Baron Lenk, that credit is due for the first introduction of such material improvements in the manufacture of gun-cotton as appeared to do away with the danger of variableness of the product, and to justify the hope that gun-cotton would soon be used as a munition of war. In 1852 the invention was made over to the Austrian Government by Schoenbein and Boettger, Von Lenk also giving them the benefit of his improvements. A military establishment was founded at Hirtenberg in which gun-cotton was manufactured on a large scale, the process being kept secret. Wool was used in skeins, which, after proper treatment with the acids, &c., were converted to a convenient shape. Cartridges for large guns and for blasting purposes were made by folding up the wool within a hollow cone of wood. For rifle cartridges the wool was shaped by weaving into a hollow cylinder. But it was soon seen that gun-cotton was not fit for fire-arms, but only for blasting. An explosion, never explained to this day, of a small store of gun-cotton at the Simmeringer Haide, near Vienna, then that of the large magazine of gun-cotton at Steinfeld, near Vienna New Town, were the cause of the abandonment of the use of gun-cotton as a blasting material by the engineers, and the greater part of the remaining stores were ordered to be destroyed. In 1870 the technical and administrative military committee made experiments in compressing small quantities of gun-cotton, but since then none has been manufactured in Austria. The place where gun-cotton is now most used is England, where it is manufactured by Messrs. Prentice, of Stowmarket, on Abel's principle. Abel, chemist to the English War Ministry, devoted himself to investigating the properties of the gun-cottons produced under differing conditions. According to his view the chief fault of the Austrian gun-cotton was that even the most elaborate process of cleaning the wool could not free it from all its impurities, in consequence of which the gun-cotton was always liable to alteration and putrefaction. The principal benefit that resulted from Abel's investigations was the removal of this drawback. In 1865 he published a new method of manufacture of gun-cotton, in which the wool is first "mashed" in

a rag engine, and the "mash" is then compressed into cake. This is the system carried into operation by Prentice, at Stowmarket. The advantages obtained by Abel's process in comparison with that of Lenk are very obvious. In Lenk's method a long-fibred expensive wool was used, whilst in Abel's method refuse of wool is taken. In Abel's process the fibre is cut up to such small parts that the de-oxidation of the wool is easy and the impurities left are reduced to a minimum. The saturation with nitre is more complete than it is in Lenk's process, and the finished cotton wool is more durable even in tropical climates than the Austrian gun-cotton. Further, the manufacture of compressed gun-cotton is free from danger, because the material is moist throughout the whole process. A further advantage of compressed gun-cotton over loose is that the latter, in order to exert its full force, must be shut in a strong case; this is not necessary in the explosion of Abel's cotton.

Dr. Brocon, of Woolwich, has proved experimentally that by means of a strong fulminate compressed cotton wool can have its full explosive force without any firm casing about it, just like nitro-glycerine or dynamite. This application of the invention of Nobel it was which first gave rise to the extensive utilisation of the English gun-cotton. Experiments are now being carried on in England for exploding moist gun-cotton by the use of dry igniting cartridges, for it has been ascertained by experience that gun-cotton can be sent from place to place in a moist inexplodible state, and can be preserved in water without undergoing any sort of alteration, and in spite of the quantity of water it will contain it retains the explosive force and high degree of force in expansion. These properties must give gun-cotton an important superiority over other blasting preparations, and it was for the sake of these properties that experiments with gun-cotton were set on foot in Prussia.

Slabs of compressed gun-cotton of various sizes, manufactured on the system of Professor Abel, at Stowmarket, were exhibited by Mahler and Eschenbacher.

Further, models of gun-cotton, prepared for use in fire-arms, were exhibited by Punshon, of London.* Punshon mixes the gun-cotton mash with cane sugar and nitre salt. By this he diminishes the "brisanz" (?) of the wool, making it more nearly like gunpowder in this respect, but free from the bad property of gunpowder of fouling the gun-barrel to excess. A small deposit, however, is always left by Punshon's preparation.

(p. 15.) *Appliances for ignition.*—The extraordinary advantages that are obtained in blasting operations by the simultaneous ignition of a number of charges, and the final recognition of these advantages, explain why it is that recently it has been a common object to discover means of ignition which admit the almost simultaneous or instantaneous ignition of many objects. There were, accordingly, in the Exhibition, besides the ordinary slow matches, quickly burning matches and electrical igniting contrivances, all very fully represented. Of slow matches were exhibited; safety fuzes by P. Heigl, Innsbruck; by the English safety fuse manufacturing company at Meissen; by Howke and Martin, Geneva; by Bickford, Smith, & Co., Tucking Mill, Cornwall, and others. All these fuses have powder cores, which, with a view to their use in a dry, moist, or watery medium, are woven in in various ways and more or less enclosed with chalk, tar, &c. These fuses are commonly distinguished according to the purposes for which they are made, as marsh and water-proof fuses. The latter are mostly those having gutta percha casings for ignition under water, in which they burn down to a depth of fifteen feet; but the marsh fuses can only be ignited at an etxreme depth under water of eight feet. The quick burning fuses, which hitherto have been exclusively used for military purposes, enable engineers to ignite a number of charges almost simultaneously.

In addition to the above, the following firms also exhibited under Group XIV.:—Siemens Brothers, Great George Street, Westminster, London (telegraph apparatus and materials, tubular iron and wooden poles with insulators, voltameter with pyrometer, electrical apparatus for deep sea

* Punshon's patent, exhibited by the Henry Rifled Barrel Company, Blanheim Works, Eagle Wharf Road, London.

measurements, electrical alarums, lightning discharger, mine and torpedo exploding apparatus, deep-sea thermometers, pneumatic signal apparatus, electrical batteries, submarine cable specimens, india-rubber and gutta-percha in stages of manufacture, &c.); Hooper's Telegraph Works, 31 Lombard Street, London (submarine telegraph cables and telegraph materials and apparatus; india-rubber core, for submarine and other lines); The India-Rubber, Gutta-Percha, and Telegraph Works, Company, Silvertown, Essex (submarine and torpedo telegraph cable, insulated telegraph wires); Telegraph Construction and Maintenance Company (telegraph cables); and others. The various constructions of cable have been considered under the groups mentioned. The third important part of electrical ignition is the igniter, which requires the introduction of intervals of interrupted connexion at those places where the blasting charge is to be ignited by means of a substance that is set in a flame with certainty by a small electric spark. With the exception of the fuse for galvanic electricity, all electric fuses, whatever the nature of their construction may be, must fulfil these conditions. (In the fuses for galvanic electricity there is instead of an interval of interrupted connexion, a fine platinum wire introduced, which, being heated to redness by the galvanic current, ignites the explosive mixture.) Of electric fuses, those for powder and those for dynamite must be distinguished. For the first, the composition of the charge is ignited of itself; the last requires one of Nobel's exploding capsules.

The electric fuses used in England for igniting compressed cotton wool may be included in this last class. Besides the composition, they contain loose fulminating mercury. Electric fuses for electro-magnetic apparatus were exhibited; powder fuses by Ebner and the English gun-cotton igniter of Abel, director of the chemical department at Woolwich, and fuses on the Prussian system for cell apparatus, &c., &c.

We would, in conclusion, notice the apparatus for preserving life, of which four specimens were in the Pavilion for Modern Engineering, two Austrian apparatus by Martony and Ebner, the French of Rouquayrol-Denayrouze and the English of Laad.* In the English apparatus the bad air is absorbed and purified in the act of breathing, by means of charcoal in a small metal cylinder held to the mouth of the workman.

Camp Utensils.

A great number of filters are, finally, to be noticed, exhibited by the German firm Buhring of Hamburg, and the English firm F. H. Atkins & Co., 62, Fleet Street, London. The last (India filter carts and barrack filters) are variously contrived according to their intention of permanence or mobility, as they are used by the troops in India, for whom they are principally constructed. Among the former are filters for tourists and the military in the form of cups, and similar filters in the latter but in the shape of phials; also filter apparatus on two-wheeled carts which are very remarkable. It is with these last that the army in India is provided; 4,000 of the hand filters in phial shape were recently supplied to the Army in Africa.

Sundry Objects.

A peculiar object which is calculated to rivet our attention is the marine anchor, of 100 centners weight, with movable self-canting arms, exhibited in the English department by Claude Martin, 9, Great Winchester Street, London (model of stern of iron-clad vessel, with patent self-canting anchor and zig-zag link chain cable). This form of anchor has been brought to the perfection that we see after repeated improvements and numerous patents, and the excellence of its construction is certified by the circumstance that it has become almost universal in England and in the navies of other states, and that Martin has received prizes for this anchor, not only in former Exhibitions but also in the present. This object, which was properly exhibited

* *Not mentioned in any catalogue.*

in Group XVII. (the Navy), is mentioned in this place, because this form of construction of anchors might be advantageously adopted for our river anchors, though they be only 100 to 150 pounds in weight. It may be true that we have no reason for rejecting our existing anchors manufactured on the system of Birago, as they have always proved good; yet we must candidly admit that an anchor manufactured on Martin's principle, which is bound to cant itself in conformity to the bed of the river, and thus to hold on with two flukes instead of one, must certainly hold sooner and faster than our own. In speaking of the Russian pontoon bridge anchor above, which is of similar construction to this of Martin's, we said that the Russian pontoon officers had thoroughly tested their anchor and were completely satisfied with it. How much more efficacious would a small river anchor be, modelled after Martin's original, and having a massive head and a shaft in the shape of a cross-piece bent upwards. In the Russian anchor the movement of the arms is confined by the fulness of the head, the head containing on one side a proper indented notch. By the removal of a bolt the arms can be separated, &c. In spite of all the above, the English construction is simpler and more solid and must be preferred to the Russian. There is one more advantage not to be disregarded which the anchors constructed on Martin's system possess. This is the facility with which they can be weighed. Experience has shown that it often happens, in the weighing of anchors of the old form which have taken a firm hold of solid ground, or, after lying a long time, have become covered with sand or mud that a most extraordinary amount of force is required, and that this difficult work is not unfrequently ended by the breaking of a cable or even of the fluke of the anchor. Let us see how the anchor is weighed on Martin's system. When so much of the chain or the cable is hauled in, that the shaft of the anchor begins to move and to rise from the bottom, there begins at once, in consequence of the shape of the head a retrogression of the two flukes out of their bed. This may not completely uncover them, but it must be allowed that it must materially facilitate their ultimate liberation. Still further advantages over the old anchors are discoverable on a close comparison. Without dwelling, however, upon them, we cannot close these remarks without expressing our belief, that it would be of advantage to have a few anchors of this description made for the Austrian pioneers, that they might make all kinds of experiments with them, especially in our rapid rivers.

Other objects that merit our best attention, and are scattered about in the galleries and pavilions of all countries in great abundance, are those relating to the manufacture of rigging of every kind. In this matter, many arsenals, dockyards, and the most eminent rope-makers of our own and foreign countries, have taken part in the Exhibition in an admirable manner. We find exhibited ropes and all that pertains to rigging, of all conceivable degrees of strength and size, of wire, hemp, flax, and so forth; manufactured by the most varied, but generally well known, methods, and of the most excellent quality.

In the English and French colonies in the East and West Indies, Ceylon, New Zealand, the African possessions, we find, in addition to manufactured rope, various new vegetable fibres in their raw condition, and in the various stages of their preparation and manufacture. These are extremely interesting, because some of them must yield a much better material for the manufacture of rope than hemp or flax. Their use for this purpose is new, and not advanced beyond the stage of preliminary experiments. It is therefore, still to be seen whether the rope-making industry will avail itself to any great extent of these materials.

In the galleries of England and North America, the spades are the class of tools which are said to have attracted the greatest attention. It is, moreover, remarkable that we find not only in these two important states, which have always been, and are probably destined to continue leaders of progress in technical science, but in most other countries,—that the shapes of this class of implement, all similar, are utterly different from anything that we are accustomed to use. The pan of the shovel is not bent lengthwise, but straight;

it is hollowed out in the centre, large on the whole, and what is particularly remarkable, it is shaped rectangularly, only the sharp corners are a little rounded off. The handle is short, a little bent, and has on the upper end either a crook or a handle cut out in an oval shape. It would probably be worth the trouble to try the experiment of using this implement of the practical English and Americans.

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MILITARY MAPS.

Extract from Report by JOSEF ZAFFAUK, *k.k. Hauptmann, Professor of Geography, &c. at the Military Technical Academy, Vienna.*

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Great Britain was, unfortunately, only represented by John Bartholomew (17, Brown Square, Edinburgh): school maps. Of the English colonies we found the following represented in maps:—New Zealand, by a map of the Colony of New Zealand, on a scale of 1 : 760·320, published by the Public Building Department,* and some others, mostly geological maps. The former is in colours, with land painted in water-colours, and is distinguished for great neatness of execution. Along with several plans exhibited by Dr. Lauder Lindsay, of 1861 and 1862, we noticed a survey of the province of Canterbury, on a scale of 1 : 253·440, four English miles to one English inch, by Dr. Julius Haast, which, by use of shade and light, represented the formation of the land as in a model.

In British India we found a lithographic coloured print from Madras, prepared by order of the English Government in the year 1873, representing the Neilgherry Mountains, the land in "hatching;" also a stratified plan of the neighbourhood of the Cholavaram Lake, and several other sketches executed in "hatching" (*i.e.*, line engraving). Dr. Leitner also exhibited maps of Upper India. The Cape of Good Hope was represented by nautical charts, plans of the gold and diamond fields, and of Cape Town, &c.; the whole exhibited by Dr. Julius Mosenthal.

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THE ART OF WAR.—PROVISIONING AN ARMY.

Report of ALEXANDER POPPOVIC, *k.k., Militaer-unter-Intendant.*

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Whoever has followed the soldier on a campaign with sympathy must have observed that in forming a bivouac after a long march or an engagement, his requirements tend rather towards rest and sleep than food. In such a disposition of the body, preparing the meat and vegetables, fetching the water and wood, not always to be found in the immediate neighbourhood, and, finally,

the cooking for several hours of tough meat and hard beans, are a real torment to him. The idea is at once suggested of supplying the troops with portable kitchens for the field, in which the food can be prepared during the march, and served out immediately the camp is formed.

One of these was exhibited by Messrs. MacKean and Company. The boiling is to be done by steam during the journey in two large boilers placed between the fore and hind wheels. This kitchen requires for all cases, both in the carriage and the heating apparatus, a process of completion, or, as the case may be, improvement. Moreover, these kitchens are subject to the same objections as the others that we have mentioned before. (These are, that the additional incumbrance would increase and impede the baggage train, that the kitchen would in any case be out of reach of the troops in advance, &c.)

Preserved food.—Preserves of meat, vegetables, and other articles of food are, with the exception of the stores for the navy, mostly confined to the provision shops. The English trade is a great exception, for the preserved beef and mutton, which is prepared in large quantities, especially in the British colonies, has become an important article of import, and on account of its cheapness and goodness finds an increasing demand, not only for the navy but also among the population. It has thereby become a regular article of commerce with large warehouses devoted to it. The late wars have given an impulse to wholesale manufacture of preserved food in other countries also, but it could not, at least in our monarchy, ever become the object of an extensive industry, because there is no popular demand for it for general consumption. The qualities required in preserves are not numerous. They must be strongly packed, remain sound for a long time, be easily cooked, or better still, be adapted for food cold and without any preparation, pleasant to the taste, contain satisfying and healthy nourishment, and, finally, be capable of being produced in large quantities at a short notice. The Imperial Royal Ministry of War, after extensive investigations and experiments, has found many articles which could be used advantageously as supplementary provisions, for example, different kinds of meat and vegetables, &c. But the experience that has already been had in this respect has shown that the repeated use of such substitutes is repugnant to the appetite, and they can therefore only be advantageously used as supplementary to the regular ménage when regular cookery is impossible. The Exhibition offered a large collection to select from.

England and the British colonies sent a variety of preserved meats, beef and mutton, pickled or salted and in vacuo, also in boxes cooked and raw, as well as meat with vegetables, soups, and meat extracts, hard or dried pea-soups (condensed peas, &c.).

Whoever is acquainted with the enormous requirements of an army in the field will derive consolation from this varied and rich exhibition, when he is assured that the required quantity could be forthcoming at the moment of need.

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DRAWING AND ART EDUCATION.

Report by J. LANGL, *Professor, Vienna.*

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The universal importance of instruction in drawing was perceived in its full extent in the assembling of the art and manufactured productions of the nations in the international exhibitions. It was clear that it is design by which most raw materials come to appreciation in social life, and that the production of forms on æsthetical principles is the first condition for the prosperous development of industry and for the improvement of taste in general. At the London Exhibition of 1851, where for the first time, from all parts of the world, the productions of industry were gathered together in international competition, a great impulse was given to the reform of art education, and England herself then took the lead in regulating, on scientific principles, and by well-organised schools of designs, the taste long guided by fancy, in bringing the systems of design into one uniform path, and in giving to its further development a basis of æsthetical principle to rest upon.

ENGLAND.

It has been already stated that England, after the first London Exhibition of the year 1851, took the lead of all the states of Europe, in reforming the existing taste in art industry by schools of design, at the same time improving her own productions in this branch. As the central establishment for this work, South Kensington Museum was founded, with the art schools connected with it, and a separate administrative office for art and science (Science and Art Department) was introduced. In all the important manufacturing towns of the country schools of art were established, there are now more than a hundred of which in existence, where instruction suited to local requirements is given in drawing, painting, and modelling. The models after which these schools work are all derived from the central establishment, from the rich collection of the above-named institution, which in all other respects exerts influence on art education. In addition to these establishments there are numerous evening classes established for artisans, which are also devoted to the same purposes.*

Two decades have passed since this movement began in England, and the progress of the art industry of England in elevation of style has been watched at the Universal Exhibitions with great interest. At that of Vienna also it was most anxiously looked for, in the hope that instruction in art industry would be precisely the branch in which an interesting picture would be displayed. This hope met with disappointment. England on this occasion laid the principal stress on the representation of her colonies. She displayed her Asiatic riches, but her home industry was deficient, her system of education most unworthily represented. With the exception of a few school works from the Kensington Schools, and a few publications from that institution, there was nothing to be found. Surprise was naturally felt that the country that originated the idea of universal exhibitions, ignored the most important element of art education, to which she is indebted for the position in manufacturing industry that she occupies at this day in relation to the other states. The great importance of the influence of the English schools of art upon the science of design during the past 20 years, is universally recognised; and yet the original tendencies have in no degree been carried to their aim, and, if we are

* The organisation of museums and art education in England was exhaustively treated in the Austrian reports on the Exhibitions of 1862 and 1867. A comprehensive description of their system is given by Dr. Hermann Schwabe.—"*Die Förderung der Kunstindustrie in England.*" Berlin, 1866.

to read the success of art education in English art manufactures, it is not yet time for the schools to repose on their laurels. Taste has been decidedly elevated; form is in all cases artistically delineated, and more accurate in style than heretofore; but there is no uniformity of tendency in the movement. But they are running rather into a multiplicity of incongruous styles. It is only in surface ornamentation that English art may be said to have struck upon a characteristic path for itself. In this there is uniformity and modern style in the designs, preserved also in the furniture to which polychrome ornamentation of surface has been applied; but in the silver ware, the bronzes, faïence, and majolica the whole history of art, from ancient India to the baroc (rococo) period, is illustrated. It is for the most part true that the historical craft (technical process of manufacture) in these last branches of industry, requires the preservation of the historical style, and as a rule more account is made of the taste of amateurs than of that which conforms to the laws of art. But the chief object of the scientific conduct of art education in England ought, for the future, to be the control of this erratic tendency of style, and the guidance of imitation into the path of independent creativeness. The question whether England will ever attain to a position from which she will regulate on all hands the tone of art and art manufacture, in respect to the technical in art, is one that time alone will solve. In this the Germans and the French are at present far in advance, and it is not to be wondered at if e.g., the most beautiful productions of one firm (Minton's), are the work of French and German artists. The English nation is one that possesses indeed an appreciation for art, but, in the aggregate, little artistic talent. This was obvious to every unprejudiced student of the art galleries, and, in a country in which the influence of pure art (i.e., high art properly so-called,) is not a dominant principle, it is always doubtful whether art manufacture can independently raise itself to the highest stage.

The science of design in England, in spite of all that has been achieved, is still fermenting. Later on—when the dregs subside—the apparatus of art education, brought into activity with the best intentions, may be judged. If we now glance over the exhibition of the Kensington schools, we find from all branches of art manufacture quiet classical work giving evidence of a general energy directed to one uniform principle in the spirit of reform. The productions could not be described as remarkably excellent (hervorragend), they excited as a whole no enthusiasm (*sie liessen im Ganzen Kuhl*) (?). The directors of the Museum exhibited on a table the system of distribution of the classes of the institute, and sought as far as possible to exhibit something from every branch. By this process the view of the activity of the school was shown piecemeal, for two or three leaves of any one special department could not give a characteristic representation of it. It was also neglected to display the programme of the institution since 1867, by the help of which that which was fragmentary in the Exhibition might have been supplemented. The course of study in the preparatory classes could not be traced without difficulty. There were, in this part, outline ornaments from models, and some in sepia shading, and chalk drawings from geometrical models. From the higher (special) classes there were copies from original models in a variety of styles, studies from nature, and independent compositions: the best among these were the rough sketches for surface ornamentation, for wall papers, textile stuffs, &c. The flowers were carefully studied, and applied with a high degree of judgment for ornament; only here and there, in the patterns for fans, their application was suggestive of French taste. The composition of the ornament is always adapted to the object it is attached to, and the purpose it is intended to serve.

Of less significance among the exhibited objects were the figure drawings. Although the execution of some statues from the antique was as perfect as could be desired, the defect of this department was betrayed in certain anatomical studies. There were very few sheets of studies from nature exhibited. Of modelling there were only a few ornaments and relief figures of no peculiar importance, but in one anatomical study the lines were accurately and truly rendered. Of mathematical drawings there were studies of

projections and perspective—some of machinery and fine architectural designs, amongst which some classical designs of ornament for rooms deserve to be distinguished. A restoration of the Lysicrates monument at Athens, which only slightly varied from the sketch of Hansen, deserves to be noticed for its neat and careful elaboration. But the most remarkable of all that was exhibited by the Institution were the drawings executed by the students from the objects in the Museum for the purpose of preliminary preparation. This unusually rich collection contained some leaves of great beauty. The chromolithographs from originals in the Museum, published by the establishment, are equally deserving of unqualified praise. Let us notice here the decorative drawings "The Twelve Months," and "The Four Seasons of the Year," by the talented E. J. Poynter, A.R.A., which the artist executed for Kensington Museum, as decorative designs for the "grill room."

It has been stated above that England was extensively represented as to her foreign possessions. Of these India, with her manufactures and art treasures, took the first rank. Interesting among her exhibits was the School of Art at Bombay, which sent models and drawings by the students, and photographs from them. The course followed by this school in the matter of style is very singular. Much attention seemed to be given to the modelling and drawing of plants, of ancient Indian ornament, and of European renaissance designs. The compositions that resulted from these three differing elements showed no great degree of harmony, and most of them were overloaded. The most successful appeared to be the patterns in which the ancient native designs were followed. The attempts at figure painting, critically considered, were not much superior to amateurs' work.

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ECCLESIASTICAL ART.

Report of HANS PETSCHNIG, *Imperial Royal Professor and Architect, Vienna.*

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The collection of photographs of religious buildings, exhibited by the Netherlands from Java, and England from India, was very rich. The isolated temples, the Dagaps, pagoda buildings, and grotto temples of the Buddhist and Brahmin religions were certainly highly interesting to every archæologist. These architectural designs were still more perfectly represented in the castings from nature exhibited by England. Completely overwhelmed with reliefs of the most fantastic, baroc design, many of the details reminded us at the same time of the friezes of the later Roman style of architecture in our own country. Towering up in pyramid form, with heavy richly ornamented offsets often terminating in cupolas, alive with figures of men, lions, elephants, birds, and other animals, in combination with ornaments from the floral kingdom and geometrical lines; this style of ecclesiastical architecture exhibits an amount of peculiarity and wealth that necessarily strikes us with surprise. When we looked at these halls we were astonished at the immense influence of religion upon art, and at the difficulties that had been overcome in the task of enshrining royally the religions of Brahma and Buddha.

England (which nevertheless does produce excellent work in ecclesiastical decoration, and remains true to her own pronounced national gothic style) took no part at all in the exhibition of works of ecclesiastical art, unless we take into account a stained glass window by De Morini, of London, and one by Constable, of Cambridge, and some specimens of paving slabs intended for the flooring of churches, and a few bronze chandeliers and lecterns.

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INSTRUCTION IN WRITING.

Report of J. HUPSCHER, *Teacher in the School of Trade and Navigation at Trieste.*

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ENGLAND.

Methods.

Happy Albion has won, without the least effort on her part (as the favourites of Fortune generally do), the reputation of possessing a peculiar system of national caligraphy. So think many professors of this art. It is in vain that we inquire into the reason for which a good Latin running hand is called in so many copy books and papers "Englische Schrift," "écriture Anglaise," "scritturé inglésé," &c., for there are none but a few quite immaterial variations of form in it. But happily this is no more than a name, and the writing of the Britons is Latin. Still the newest English system, which is treated by no caligraphist, deserves to be mentioned here by itself, although there were no specimens of it sent from England to the Exhibition. This method disregards all the difficult oval and half oval strokes and makes the whole Latin alphabet pointed or cornered. The system is not æsthetic, but in return it is practical and gives little trouble—it is just English. This pointed writing of the Latin letters has become almost universal in England, because the reigning Queen Victoria was the first to adopt it. Externally all these handwritings have a great resemblance to each other. Partly for the sake of its convenience, partly under the influence of fashion, this kind of writing has obtained many adherents, especially among ladies, on the continent also, and all the world seems to be aware of it, except the specialist in handwriting, as no continental caligraphist has as yet taken it up and adopted it into his system.

Benches.

England sent to the Vienna Exhibition specimens of three different systems of benches for schools. The firm W. Callaghan of London exhibited a system contrived to meet the recommendations of the oculist Dr. Liebreich. The Doctor, in his zeal for his own profession, has left out of account the circumstance that besides the controlling eye there is the working hand engaged in writing, and has fitted the otherwise very carefully and efficiently constructed school bench, with a writing table so enormously inclined from the horizontal that the hand must, after some time, be fatigued beyond endurance, and rendered quite unfit for work. On the other hand he was more successful with the inclined reading desk, of which the front part of the writing table could be turned over upwards. The support for the back is a narrow concave piece of wood, introduced horizontally under the shoulders, and is intended to serve the double purpose of a support for the spine and a resting place for the unoccupied arms. The stool slopes. The writing desk has a border on the left hand on which to lay the book from which the copying is being made.

George M. Hammer of London exhibited double-seated school benches of simpler construction for the people's schools, and another kind with reading-desks made to be turned over upwards, convex backs, and a rest for pens on the writing-board. Both of these benches are sloped too much for convenient writing.

C. E. Hawes of Norwich exhibited school benches of very practical construction, with writing boards, the lower half of which turned over. The support for the back is bent a little too much on the slope backwards, but the desk is not excessively slanted.

Steel Pens.

The steel pen manufacture was excellently represented by three of the most celebrated English firms. Joseph Gillott, C. Brandauer, and D. Leonardt vied

with each other in the abundance and tasteful arrangement of their productions, which were for the most part excellent. Maurice de Leon and Co. exhibited their penholders provided with a reservoir of ink. This manufacture is an improvement upon those of previous construction in that a spring being pressed upon lightly it fills itself by absorption with ink, which it then allows to flow gradually into the concavity of the writing pen; the old inkstand holders on the contrary require to be first filled up. This convenient writing implement nevertheless appeared to us to be valued at too high a price.

British India.

We are positively obliged to remind ourselves over and over again of the severe limits of our task of arbitrament, that in the excess of our joyful astonishment and reverential absorption in the primeval history of human civilisation, we may refrain from writing down, in lieu of a dry objective report, a contemplative lyric poem. He must carry in his bosom a heart of steel, incapable of all finer emotion, who can contemplate unmoved the writings and other objects devoted to instruction which have been sent to us from India, and which form a focus of brilliancy to the whole of the Universal Exhibition of 1873. From the simple tripedal inkstand belonging to the sheet of writing cloth, prepared on one side and rolled up into a scroll, and the pen of Bengal cane, up to those complicated alphabetical designs in which the songs and writings of the Indians are preserved, as well as the original types of our so-called Arabic system of numeration and the shapes of the numerals—what impressions, what a flood of thoughts must these objects in the midst of a Universal Exhibition of the extent and importance of this excite and conjure up. To Dr. Leitner and the intelligent corporations and school authorities of British India, however, we present our most sincere thanks for their lively participation in our Universal Exhibition in this branch of the science of education, which is in this place as especially honourable and important in its bearing on the progress of civilisation, as it is intrinsically interesting. Such slips of palm leaf paper as we see before us here may have been the material on which the primeval literature of Hindustan, as celebrated now as it is important to us, was written in an alphabet many letters of which, as in the case of most of the dead languages, stand before our eyes as unsolved phonetic problems. With just such writing-boards covered with chalk as the schools of Hindustan exhibited, the sons of Zoroaster may, thousands of years ago, have made their first attempts at writing and calculation, and the same caligraphic frivolities and bordering ornaments as we see before us have surely, inconceivable ages ago, afforded pleasure and amusement to the children of the daylight. The system of conveying instruction in writing, like ours of modern times, proceeds analytically, and has very good results to show, both in the various forms of the native Indian systems of writing and in the Arabic. The Latin writing also has many a laudable representative among the native scholars who translate from or into English, and show that they also have acquired the art of using the steel pen. It may be that European policy has not spared the children of the East much wrong, but European civilisation is humane, and repays to the descendants with usury what their first ancestors contributed to the intellectual development of humanity.

Specimens of the writing of scholars were sent by *the Local Committee of Bengal, the Local Committee of Madras, the Department of Education of Bombay, the Local Committee of Bombay, Mr. Kampson, Director fo Public Education in the Northern Provinces*, the *Rajah Jye Kishen Doss* (caligraphic), *the Director of the Government College at Agra, the Local Committee of the Punjaub, the Government of Oude, the Department of Education in the Central Provinces, the Local Committee of Mysore, the Local Committee of Berar, and the Local Committee of Hyderabad.*

From Madras *Abdus Sarnat* sent tastefully executed specimens of Persian caligraphy, and *B. R. Tagure* of Bengal an interesting tabular collection of all the alphabets that are used in India. In the rich and instructive exhibition of the praiseworthy *Dr. Leitner*, we also found many specimens of writing from the schools of India and the Cape of Good Hope. In this way England

has richly compensated us for the void that she has left in the illustration of her own materials for education at the Vienna Universal Exhibition.

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APPLIANCES FOR INSTRUCTION IN GEOGRAPHY.

Report of ANTON STEINHAUSER.

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The only hanging maps of English counties were those of Lancashire, published by John Bartholomew, of Edinburgh. The other counties were contained in the volume of 200 proof engravings from the same publisher.

The exhibition of the British section was very scantily supplied; no educational material in this branch of study were included in it, except a few school maps, probably forming together an Atlas, which were among the proof engravings shown by the Exhibitor above referred to. These engravings also comprised small plans of cities, débouchements of rivers, and so forth, elaborated principally with a view to political geography. We noticed also an Elementary Atlas, containing eight maps in the Hindustanee language; and the Comprehensive School Atlas of William Hughes (Phillips and Son, London), which contained 40 maps, including five devoted to ancient geography. These were all that were exhibited, although the English schools and those of the colonies, Canada for instance, are plentifully supplied with hanging maps and hand maps. The number of real school Atlases intended for the lower classes, in the section of the British Empire, and also in the free states of North America, was limited to the text books for which maps and illustrations are printed, often in considerable number, in wood engraving. These text books, in some sections adapted for the higher classes also, are arranged in the parts intended for the schools for the people, in the form of question and answer.

Maps in relief made on a small scale may have their defects, but if they are supplemented by other signs, such as threads or wires for the roads, pins' heads of different sizes for places, incised grooves for rivers, raised points for boundaries, and so forth, they are a very useful accessory to instruction of the blind, and there were some in the Exhibition of this class, viz., in Austria, the German Empire, and in the English section, which had a physical map of England, by Brion and Son, 1872, with raised boundaries and mountains.

In the Exhibition of the British Empire there was no Atlas of a high class containing maps of political geography, unless 48 maps in folio, among the 200 proof engravings exhibited by John Bartholomew, of Edinburgh, are to be considered as forming such an Atlas. The cause of this and other blank spaces must not be attributed to the non-existence of such cartographic works, which in a seafaring nation whose navy rules the sea is inconceivable; but, as neither the Marine nor Land Survey sent their abundant treasures to share in the Universal Exhibition, it is less remarkable that private industry in this branch abstained also.

What Heinrich Berghaus was for Germany, that Johnston, following in the footsteps of this veteran of geographical science, has become for England. The valuable physical Atlas of Keith-Johnston, with a letter-press explanation, contains well-arranged maps of geographical strata of 250, 500, 2,000, and 5,000 feet elevation, two meteorological maps illustrating rain-fall a map of the fluvial systems, &c. We were all the more pleased to light upon this beautiful Atlas because the cartography of Great Britain was so scantily represented in the Exhibition. Among the specimens of engraving, already

mentioned, exhibited by J. Bartholomew, of Edinburgh, there is a semi-physical map of the earth on Herschel's projection, to which supplementary charts, of the isothermal lines, &c., are appended.

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THE PAVILION OF THE LITTLE CHILD.

The project of exhibiting, in a separate pavilion, all that has reference to the nurture and education of the child, from its birth until its admission to a school, originated with Mr. Julius Hirsch, the reporter to the President of the Directors of the Exhibition, and was incorporated into the programme of the supplementary exhibitions. The programme drawn out by a committee was approved by the General Direction and published. In pursuance of this the Commissions for Great Britain, China, and Japan promised to participate in the exhibition.

The English are an example to the world in the education of their children. In consequence of the conditions of climate and national custom the child passes the greater part of its young days in one and the same apartment. The winter season, which keeps all children prisoners to their apartments, lasts long in England, and in the towns the children seldom get out into the open air even in summer time. The health and growth of the child are therefore dependent on the healthy position, pure atmosphere, and appropriate arrangement of the apartment in which it has almost always to live and move.

It is well known that in the Englishman's house, which has generally only from two to four windows of frontage, and is built up two or three storeys in height, the children's room is placed in the uppermost storey, because, in towns where the streets are narrow, this is better lighted, more airy, and therefore healthier than the rooms of the lower storeys.

Good ventilation is carefully provided for in these rooms. The windows are made moveable in such a manner that a lower sash can be pushed up, and the upper sash pushed down; leaving open spaces above and below, which can be made larger or smaller as is found best adapted to the condition of the weather. The cool and pure air enters in a current by the lower opening of the window; and the warm contaminated air of the apartment escapes through the upper opening. This convenience is not so perfectly obtained by the horizontal opening of the windows that prevails in the houses of most other countries.

In all English houses, parents in respectable circumstances lay down warm soft carpets on the floors of the rooms. The child can sit down, crawl about, and run bare-footed over such carpets, without catching cold, and comes to no harm when it falls.

The fundamental requisite for a healthy nursery is pure moderately warm atmosphere, and a temperature that varies as little as possible. Bad air has the same effect on a child as bad food; and the child that only takes food a few times in the day breathes about 30,000 times in the 24 hours, and incurs, with every inspiration, the danger of contaminating the blood in its lungs and poisoning itself.

The nursery is not much ventilated, because draughts of air and chills are dreaded. But a draught can be cut off by a screen or provided against by proper firing and clothing; while good air can only be had by its admission from the atmosphere outside of the house. The apartments of the children in a prince's mansion and in a palace should for this reason consist of several

rooms, so that one can be aired while the children are kept in another. The English are careful to admit fresh air throughout the whole of their houses, and have the stove and the windows arranged in such a manner as to promote ventilation without allowing the draught of air to be dangerous; a provision from which the children derive the greatest benefit.

The child requires to be kept clean with great care. During the first months of its life it ought to be bathed and washed daily. The arrangements for this purpose consist of the bath and the swaddle table or washing table. In the nurseries of princely houses and in the English nurseries there were swaddle tables of a most excellent model. [This must allude to the ordinary nursery childs' washing-stand.]

The English Commission exhibited in one of the side rooms the complete arrangements of an English nursery, including the furniture of a child's bed; a cradle and a "swaddle table," with the linen belonging to it. According to the English custom the child is kept warm by light but thick woollen clothing. For the rest, the linen and little clothes of the child are so arranged as not to hinder the little ones in the free movement of their limbs.

In the pavilion of the little child and in the other departments of the different countries a great number of cradles were exhibited, together with drawings and photographs of the same, so that a complete collection was presented. These can be divided into two classes; hanging cradles and cradles on rockers. All those in which the basket or the bed for the child is hung so as to swing on a fixed axis we call hanging cradles. To this sort belong the iron cradles ornamented with gilding, silver or bronze, in the English, French, Austrian, and Spanish divisions. The iron cradles in the English and Austrian divisions were very beautiful.

The mother encircles the child in every attitude with her arm. This the child's chair should replace as closely as possible. The feet must have a place to rest upon, because hanging down the feet tires the child and impedes the circulation of the blood. The seat must be of a proper height, in order that the child may be kept upright, whether in playing with its toys on the table in front of it, or engaged in writing or other occupation. If the board which acts as a table to the chair is too low, the child has to bend down, and there is great danger of the spine becoming permanently curved. If the table is too high it has the objects too near its eyes, and becomes short-sighted. Several children's chairs were exhibited in the pavilion of the little child. That in the English nursery was excellent for an arrangement to prevent the little child from falling forwards off the chair.

The rocker and the rocking horse are among the common articles of furniture of a nursery and are favourite toys with the children. Nature urges them to movement, and the rocking is healthy; it developes the lungs by exciting a strong inspiration and exercises the child in preserving its equilibrium. Excellent models of rockers for children were exhibited in the English nursery and in the collection of Mr. Cremer, junior, of London. These rockers have three seats, and can be used by three children at once, one on the seat in the middle, who sets the rocker in a see-saw motion by moving to the right or to the left, and two others on the outside seats, which balance each other. They are not easily overturned, make little noise, and have a gentle motion.

The English hard ball used in the game of croquet was represented by several specimens, and it is to be hoped that the Child's Pavilion may be the means of making this very healthy game generally popular.

Mr. Cremer, junior, exhibited a collection of all the children's toys known in commerce. A furnished English room, dolls with their toys, games for exercise, including the recommended game of croquet, horses, carriages, ships, sedentary games, children's billiards, and so on. These toys furnished an interesting subject of comparison with those in use in Germany, and still more interesting was the comparison of them with the children's toys which the Chinese and Japanese exhibited in their recess.

The collection of children's books is undoubtedly richest among the German people. Next to the Germans the English and French have the most books for the primary education of children in their tenderest age.

WOMEN'S WORK.

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In former times, and even at the time of the last Universal Exhibition in Paris, in the year 1867, a report on women's work could hardly have ranged beyond art embroidery and lace making. If there were at that time women industrious and active beyond the limits of their proper calling they did their work in retirement. This female activity was not esteemed, it was barely tolerated, not without some sense of distrust. This has all changed within the last few years. The greatest interest is taken in the question of women's industrial capability and capacity. Much — incalculably much — has been done in this respect by Austria, Germany, England, and America. In the Exhibition England only represented the work of her women by Irish laces, which is made with the bobbin, the crochet needle, or the sewing needle, partly by school children, partly by adults. Some of this lace appeared to be very beautifully worked.

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Manufacture of Spirits, Liqueurs, and Vinegar.

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Excepting for the rougher duties of day labourers, the manufacture of spirits and of vinegar, in which some parts of the work require to be done with great caution and other parts demand the exertion of great physical strength, is not one to which female labour is employed. But it is different with the manufacture of liqueurs, for which the most necessary qualifications are neatness and order. Moreover most of the manipulations for this manufacture can, with attention, either be learned immediately without any special previous knowledge, or, at most, the requisite dexterity is acquired by a little practice in a few weeks. The preparation of the essences and the mixing of the liqueurs is almost always undertaken by the liqueur manufacturer or manager himself, so that the tasks left for the workwomen are only the following:—

1. *Filtering the finer liqueurs.* The object of this is to make those liqueurs clear and brilliant which are not perfectly so after the mixing. They are filtered, with repeated application of filtering paper, through clean filtering bags of flannel or felt, or through layers of cleanly washed quartz sand, which is laid upon flannel in large glass funnels.

2. *Storing the liqueurs after filtration.*—The liqueurs are simply filled into the barrels intended for them to ripen in.

3. *The bottle business.*—This falls into the following subdivisions:—(*a*) *Washing the liqueur bottles.* The bottles are washed, outside and in, in lukewarm water (by the help of cylindrical brushes on wire handles) and put in a stand to dry. (*b*) *Rinsing the bottles.* Before they are filled with liqueur they are rinsed with pure spirits of wine and drained out dry. (*c*) *Filling the bottles*—with a can and a funnel. (*d*) *Corking the bottles.* This is done either by hand, or better and more safely with the corking machine. (*e*) *Sealing the capsules.* The bottles are sealed either by dipping the neck into molt n sealing wax or in the ordinary way of using it, and stamped; or they are capsuled, that is, tin capsules are put on the neck end, already

stamped and rubbed tightly on to it with a peculiar arrangement of lacing or catgut. (*f*) *Labelling the bottles.* The labels are fastened with paste. (*g*) *Packing the bottles.* First folded in paper, then in straw, and then packed tightly together on layers of straw.

Nearly all the above work is done standing, but in general without any great exertion of strength. It is necessary that the workwomen should have passed the course of the public schools (Volksschule) as, in addition to the above work, they are generally entrusted with the retail sale and must for that be able to read, write, and calculate. The intervals left at their disposal by their work they fill up with needlework. There is no partition of labour in this business. The women attend at the factory from six in the morning until seven in the evening and live there, receiving breakfast, dinner, tea and supper, and monthly wages from 8 to 14 florins in amount, the average being 10 florins.

Breweries seldom employ women; those that employ a very limited number do so only as day labourers at 50 to 60 kreutzers a day.

Manufacture of effervescing beverages employs women in the following capacities:—

1. *Soda-water Manufacture.*—(*a*) *Handing in and washing the syphons* (soda-water bottles). This work, for which experienced hands are required, consists in handing the empty syphons to the persons employed in filling them, receiving them back filled, and then placing them in order in a vat filled with water. Then the washer has to watch whether the full syphon ejects bubbles under the water; this would show that the metal head is loose, in which case the syphon is rejected. Then she washes them in order with brushes, flannel or linen rags, continuing all the time to hand them in to the fillers and remove them when filled. Weekly wages, 4 to 5 florins. (*b*) *Polishing the taps of the syphons.* The mouth of the tap having been fitted with a small stopper, to prevent any dust entering it, the whole tap is painted with a soft brush with polishing powder (chalk, magnesite, &c.) dissolved in water, and then polished with a soft cloth until it is bright. Then the particles of chalk still remaining in the seams are removed with a small brush and the syphon is prepared for delivery in the small box that stands ready. Weekly wages 4 to 4½, sometimes to 5 florins. (*c*) *Washing bottles* first with shot in running water, then a second washing in clear water. (*d*) *Labelling.* The labels are applied to a board smeared with a solution of gum and then to the bottle, or ready gummed labels are used and damped with a sponge. Wages 4 to 4½ florins a week. (*e*) *Filling.* A lever worked with the right foot lifts the bottle to contact with the jet pipe, and care has to be taken that the two orifices precisely fit. Then by turning a tap the fluid is admitted into the bottle as long as the atmospheric air in the bottle admits it, when, by a gentle raising of the foot from the lever, the compressed air escapes from the bottle, and the tap of the filling apparatus being opened again, the filling of the bottle is completed. Weekly wages, 4½ to 5 florins.

The work described above is almost entirely done by women in the manufactories of Vienna and its neighbourhood. As far as can be ascertained, there is only one manufactory which employs women for the other more difficult work with the apparatus, such as filling syphons, generating carbonic acid, filling "balloons" for drinking shops, &c.

2. *Manufacture of Champagne.*—In this manufacture women are only employed in washing and labelling the bottles. Many of them are married. They are generally remarkable for thriftiness and neatness in dress and in their households. Their hours of labour, including pauses, are from six in the morning until six in the evening in summer, and from seven in the morning until half-past six in the evening in winter. The work is done on the manufacturer's premises. At present about 150 or 180 women are so employed in Vienna.

The manufacture of Confectionery.—Sugar and cake baking. Girls and women, mostly between the ages of 16 and 30, are employed as saleswomen, and for the easy supplementary operations, such as folding bonbons papers, packing, and so on, some also in accounting. Nearly 200 girls, mostly Germans, are so employed in Vienna. They generally live with their

employers, receiving, besides entire board, from 8 to 20 florins per month, an average 12 florins. They are engaged, pauses included, from 10 to 14 hours every day.

In this branch of industry, as well as in many others of the food group, the range of female labour might be much extended. This remark applies not only to such occupations as are properly a part of the manufacture, but to connected supplementary work, such as peeling and preparing the fruit for boiling, preparing and cutting the bonbons papers, making fine envelopes for confectionery, and to the ornamental work, in great demand at Christmas time, which is now mostly imported from France and Germany.

Gingerbread.—Female labour is only employed for a few of the easy operations, such as preparing the almonds, covering the gingerbread with almonds or sugar, making parcels of gingerbread, and so forth. The whole manufacture is insignificant, and these employments are discharged by the wives and daughters of the baker or his domestic servants. These last receive, besides complete board and lodging, a monthly pay of from 7 to 16 florins.

Manufacture of Chocolates and Candies and substitutes for Coffee.

1. *Chocolate Manufacture.*—The heavy work is exclusively done by men, but women and girls are employed in the following operations:—1. Removing stalks and stones from the cocoa beans. 2. Removing the seeds from the roasted and pulverised cocoa. 3. Weighing out the chocolate, and forming it by the help of mechanical arrangements into tablets of various dimensions. 4. Turning out the chocolate tablets hardened by cooling. 5. Folding up the tablets in an inner and outer cover and labelling. 6. Modelling designs in chocolate with metal forms for the purpose, and ornamenting each piece according to taste. 7. Preparing dessert chocolates, folding them up, and arranging them in paper boxes of various sorts. 8. Weighing the prepared manufactures for delivery. 9. Ornamenting the sugar plums delivered in models of fruits. 10. Folding in the sugar goods sent to the trade in the form of bonbons. 11. Cutting out the different labels where the cutting machine cannot be used.

2. *Manufacture of candied goods.*—Female labour is used here, in arranging the various bonbons in small boxes or cases or paper envelopes, and in making pipes of sugar, in which they have to pierce them and try the pipe. Little girls are employed to thread the sugar drops on to twine, making leaves and stalks on apples, and in the peppermint manufacture to bring and remove the metal trays upon which this is dropped, taking the lozenges off the tray, &c., &c.

3. *Manufacture of substitutes for Coffee.*—Women are employed, 1. To weigh the meal and put it in paper envelopes. 2. To prepare these papers, close and finish them full. 3. To label the packets.

The weekly wages of the women employed in the chocolate manufacture in Vienna are from 2 fl. 50 kr. up to 6 florins. The working hours are on the average 11. The work is always done in healthy, properly warmed localities, is on the whole easy to learn and not fatiguing. Some of the processes require dexterity and taste, as for example folding the chocolates or ornamenting the prepared sugar plum bonbons.

Tobacco and Cigar Manufacture.

The greatest part of the female labour is employed in the manufacture of cigars, as these are generally made without the use of machinery. Firstly the raw material has to be made ready. One of the preliminary processes is moistening. Next the moistened leaves of tobacco have to be freed of the central fibres, then to be assorted for outside covers or filling material. The filling material is prepared for the further processes by a moderate drying, but the covers are given over in a moist condition. Thus prepared, the tobacco leaves pass over to the proper cigar women, two of whom work together. The younger of the two, (the assistant or folder), is entrusted with the preparation of the inner body of the cigar, called the doll or the "wickel"; the elder, (the spinner), wraps up this "wickel" in the proper covering leaf and completes the cigar. These two girls working together produce from 200 to

800 cigars in the day. The quantity is regulated by the fineness of the kind. When the cigars are settled, they are assorted according to colour and packed.

Cigarettes are made with machines and by three women working together. One does the filling, a second rolls up the cigarette upon the machine and covers it, and the third puts in the mouthpieces.

The preparation of tobacco for smoking in pipes is generally conducted by means of machinery worked by steam or water power. Female labour is therefore limited to sorting and arranging the kinds of tobacco to be cut up, and packing it after it has been cut. Fine sorts of tobacco are packed partly in metal envelopes, partly in packets and small paper covers; common sorts in bags.

Snuffs are also manufactured by machinery, and women are only employed in packing them.

Besides the above-mentioned operations women are employed by the Imperial-Royal tobacco factories on several others which they contract to do by piece work, such as smoothing the leaves in bundles, feeding them into the press, making bags and other necessaries of common linen cloth with sewing machines. (Here follows a table showing the distribution provincially throughout Austria of this industry. The aggregate results show:—In all Austria 26 manufactories, employing 22,462 females, of whom 3,950 are between the ages of 14 and 20; 14,872 between 21 and 35; 3,639 between 36 and 60 years. The daily earning varies in the preliminary preparation of cigars between 50 and 75 kreutzers, ages 25 to 55 years; for the "folders," age 14 to 25, between 40 and 85 kreutzers; for the "spinners," age 25 to 40, between 60 kreutzers and 1 florin 30 kreutzers; for the women employed to sort and pack, age from 20 to 40, between 60 and 85 kreutzers; the women employed on contract in the cigar factories earn from 60 to 95 kreutzers a day. In the manufacture of tobacco for pipe smoking the sorters, age from 25 to 45, earn 62 to 86 kreutzers upon the finer sorts, and from 60 to 75 kreutzers upon the common sorts of tobacco; the packers, aged from 25 to 50 and more, earn from 65 to 85 kreutzers per diem. In the manufacture of snuffs the women employed are mostly from 30 to 50 years of age and their daily earning amounts to 65 to 85 kreutzers. The day's earnings from supplementary work are from 60 kreutzers to 1 florin).

Cleanliness being enforced with unbending severity, proper ventilation cared for, and medical attendants attached to the manufactories, the sanitary condition of the workpeople is favourable.

Manufacture of Artificial (Shoddy) Wool and Cotton.

The increase of the use of the so-called artificial or renaissance wool in recent times has extended the range of female labour. The rags, which are the starting point of the re-application of the already used wool, have in the first place to be cleaned. Part of this is done by the machine, but the human hand is required for the removal of the cotton threads, &c. After this the rags are sorted according to colour and fineness. The tax on strength and attention is the same in this sorting process as in the same process with natural wool, but this is the most disagreeable and repulsive of occupations in dealing with artificial wool, and the impurities handled are often injurious to health. Females of all ages can be employed in this work, the younger for cutting up, freeing the seams, the older and more experienced for sorting. The earnings amount to 3 florins or 3 fl. 50 kr. a week.

Of still more recent date is the manufacture of the article recently introduced into commerce under the name "Flug" (*anglicé "flight."*) The substance of this also is rags, old stockings, threads, torn worsted, &c. The produce is used as filling, for making wadding, bed covers, &c. About 10 to 20 Vienna pounds weight are manufactured by a machine in an hour. Girls are employed from 14 years of age upwards. Their weekly earnings are 4 to 5 florins.

Carded Yarn—the manufactured produce of which consists of cloths and dress stuffs, employs female labour for the following processes:—1. *Sorting the wool.*—The object of this process, which is exclusively done by hand, is the assortment of the wools—which vary in fineness, ruffling, length, and colour in separate fleeces and still more in large parcels—according to the qualities required for the material that it is intended to make of them, and the removal of certain impurities, such as burrs, &c. The quantity that a woman can thus prepare in a day varies between 50 and 100 pounds. The earnings are 3 florins or 3 fl. 50 kr. per week. The work can only be done by daylight, partly sitting, partly standing. It requires very little physical strength, but a certain amount of attentiveness, some common sense, and experience. This is the reason that elderly people only are employed upon it.

2. *Scribbling* (that is, *preparation* of *slub* or *roving*).—Scribbling machines are used for this process, during which the wool passes through the following stages:—(*a*), that of a transparent fleece; (*b*), "pelz or fleece;" (*c*), *slub* or *roving*. The "roving" is wound on to bobbins and set on the spinning machine for spinning into thread, in which latter process only men and boys are employed. Mostly young women are employed at the "scribbling," whose average wages are 2 fl. 80 kr. to 3 florins a week. One girl is able to attend to a "set," that is, the series of machines which convert the wool (through the stages enumerated above) into "roving."

3. *Reeling.*—That is, winding the thread, as it comes from the spinning machine on a reel, into skeins. This does not require much exertion of strength, but close attention, as there are inequalities to be separated from the yarn and broken threads to be rapidly knotted together. The average weekly wages depend on the hours of work and vary from 2 to 4 florins.

4. *Spooling.*—That is, winding the yarn on to spools, conical or cylindrical in shape, that the weaver may have his material in the most convenient form. The machine used for spooling the warp demands little strength, but attention and handiness. The workwoman performs her duty of laying on the yarn, arranging the machine, and knotting the threads whilst she walks to and fro in a space of about two fathoms. The machines are generally put in good, light rooms. A machine attended to by two girls winds with 20 spindles or yarn winders about 500 hanks in a day. Wages average 2.50 to 3 florins a week. Spooling the weft is done by boys and girls; the worker sits in front of the spooling wheel and has to keep both eye and hand active, for attention and handiness are the chief requirements of this work, which, however, does not tax the physical strength. The spooling wheel is generally set up in the weaving room. The daily wages are 30 to 35 kreutzers.

5. *Warping* can only be done in a good light, is not laborious, but requires dexterity. It is not so monotonous as the work already described. The attitude is changed by sitting, standing, and climbing on a bench of two steps in height. The average wages are 5 to 6 florins per week.

6. *Weaving.*—The steady increase of power looms is making this branch of industry adaptable to a limited extent to female labour. The hand loom requires a man's strength, but a power loom can well be attended to by a girl as the machine does the work, and the only attention it requires is in setting in the spools and knotting broken threads.

7. *Burling, &c.*—Removing ends of thread knots, &c. from the rough cloth as it comes from the loom is a most monotonous and wearisome labour devoid of all intellectual effort. Two girls sit before one piece of cloth with their backs to the window, and a sloped table before them. The work taxes the eyesight very much. Wages are from 2 florins to 5 florins per week.

Embroidery Generally.

Embroidery has the following branches, distinguished according to the material used or the process adopted. *a.* Relief and flat embroidery with metallic threads. *b.* Relief and flat embroidery with open or twisted silk and chenille. *c.* "Appliqué" embroidery (in colours). *d.* Mosaic embroidery. *e.* Turkey embroidery. *f.* Berlin and canvas embroidery. *g.* White embroidery.

a. Relief and flat embroidery with metal threads.—This branch of industry contains the following processes:—1. The metal thread has to be arranged on a couch of pasteboard, leather, cloth, felt or wool and fastened with a silk thread. This process requires a moderate exertion of strength of the arms, an eye for outline and careful accuracy. 2. Spangles are fastened with silk thread and bullion to cover and ornament the lines where the reticulation is excessively open. 3. Sewing with the metal thread is done in small objects. 4. On very broad spaces the metal thread has to be arranged and fastened with silk thread.

b. Relief and flat embroidery with open or twisted silk and chenille.—Relief embroidery is worked in silk in precisely the same manner as in metallic threads with the same implements, and is brought to the greatest perfection in the so called "needle painting," an art which taxes the physical powers very little but fully employs the mental, requiring not only a knowledge of design but an appreciation of the harmonies of colour. It is in fact indispensable that the worker should have acquired besides manual dexterity an artistic knowledge of design and colour. Tambour embroidery is a kind of flat embroidery done with a proper needle on a frame of peculiar construction in twisted silk. It closely resembles flat embroidery, but for durability and quick work is decidedly superior to ordinary flat embroidery. The machine invented for doing such work as this is not yet generally used in Austria, but it is very desirable that it should be more generally introduced.

Crape embroidery is a branch of the art of flat embroidery of extreme delicacy, worked with separated threads of silk (*filoselle*) the practical value of which is very questionable, and for this reason, not less than for the great difficulty of the work, it is very little cultivated.

c. Appliqué embroidery is one of the few branches of embroidery in Austria in which hand labour is supplemented by machinery. The machine used is the so-called chain stitch sewing machine. With this straight lines and large ornaments are executed, and the finer curvatures and more delicate ornaments have to be worked by hand. The process begins with sewing strips of one or more materials of the same or different colours loosely on to the proper ground, and then stitching, in piqué work by hand or machine, the design traced on the back of the ground material, after which the loose pieces on the other side are cut away with peculiarly constructed scissors. To do this work well it is not enough that the worker possesses a perfect knowledge of the sewing machine and its peculiarities, it is also indispensable that she should endeavour to reproduce the designs set before her with feeling and understanding. A great future might be predicted for this branch of embroidery, if the available labour could be increased to meet the demand for it. At present the lack of skilled workers is very much felt, and it works prejudicially on the development of the manufacture.

d. Mosaic embroidery.—Mosaic embroidery occupies the same position among the methods of textile ornamentation that intarsia does in wood work. The object is, instead of putting on the required ornament as in appliqué embroidery, to insert it, and the lines that separate the ground from the insertion are, for ornament and use, embroidered over with one or many coloured designs. As in all mosaic work so in this, it is not forbidden to construct the areas of ornament of parts of one or many coloured material, but the design must be adapted for ornamentation of areas.

e. Turkey embroidery.—Hitherto this art has been represented in Vienna only by work utterly worthless from an æsthetic point of view; such as those cushions ornamented with flowers, fruits and animals closely copied from nature, which were a long time fashionable but now have fallen into well deserved neglect. Rationally carried on and managed on art principles this branch of industry would admit of great development, but here also the want of available educated labour is an impediment. The process on the whole resembles that of velvet weaving. It consists in the embroidery on canvas, after a painted dotted design, with wool and a needle sharpened at one end, and, when all the visible points on one line of the design are embroidered, the meshes of wool are cut with the sharp end of the needle. When the whole is worked, the empty parts of the canvas are cut away and the nap—the ends of woollen thread—sheared off. Great regularity of treatment is indispensable or the whole work is worthless.

f. Berlin and canvas embroidery.—The effect of this partly resembles that of Gobelin tapestry, especially when it is done with the difficult pearl stitch; the result of the ordinary cross stitch is in effect and workmanship much coarser and very far from that of the Gobelins. Embroidery is done with wool, silk or cheneille, after a pattern painted on card board, upon canvas in such a manner that one diamond of the pattern always corresponds to one interstice of the reticulation of the canvas. Embroidery on perforated paper is the same process but is generally only applied to the manufacture of small objects.

g. White Embroidery and Tambour Work.—This very extensively cultivated branch of industry is probably the least lucrative for the workers. In general, it is a kind of flat embroidery, and the process only varies from that of silk embroidery in respect of its material and purpose. White embroidery is at its highest perfection in the imitations of guipure and lace. The last, however, on account of the great demand it makes on the intellectual powers, employs but a small portion of the workers. Tambour work in all other material is the same process as tambour work in silk.

The duration of the term of apprenticeship in Vienna for general embroidery varies much with the capability of the individual, but experience has fixed it for flat and raised embroidery with metallic threads and with silk, and for appliqué and mosaic embroidery, at a minimum of three years. For the other branches a shorter period is sufficient. The apprentices are received when they have completed their education at the people's school, and at the close of their apprenticeship are admitted as assistants. In the first period of their apprenticeship they are paid weekly wages of 1 florin to 1½ florins; and for the first period after completion of their apprenticeship from 2½ to 3 florins. It will be seen from the above remarks on branches of embroidery industry that all the workers must, indispensably, acquire practical and theoretical knowledge of design, and partly of painting also. Their industry can without this make no real or lasting advance. The means to this end would be the participation by all apprentice girls in instruction in drawing, and the foundation of the pattern or specimen depôts. All kinds of embroidery are trying to the eyesight, and the perpetual attitude of stooping taxes the endurance of the lungs and digestive organs. Raised and flat embroidery with metallic threads, appliqué and mosaic embroidery are mostly done in closed workshops, the other kinds generally at the worker's home. It is impossible, therefore, to report accurately the number of persons so employed. Berlin and canvas embroidery are often taken in hand in spare hours from other employment. It is the occupation of persons who are not working for the whole of their maintenance, such as the wives and widows of public officers and such classes. For relief and flat embroidery with metallic threads, and for appliqué and mosaic embroidery, the extension of the factory system and the formation of a centre for trained and educated labour would be very useful in promoting advance in art. The number of persons in Vienna and its suburbs engaged in embroidery may be estimated at 1,500 to 1,600, of whom 10 per cent. earn from 5 to 10 florins, average 7 florins, weekly, in raised and flat embroidery with metallic threads; 40 per cent. earn from 4 to 8 florins, average 6 florins, in silk, white and tambour embroidery, ordinary work; 40 per cent. earn 4 to

6 florins, average 5 florins, in berlin and canvas embroidery; 4 per cent. earn 5 to 7 florins, average 6 florins, in appliqué and mosaic embroidery; 3 per cent. earn from 6 to 8 florins, average 7 florins, in Turkey embroidery; 2 per cent. earn from 11 to 15 florins, average 13 florins, in the fine silk embroidery called needle painting; and 1 per cent. at imitation of laces, and so forth, which requires a high degree of skill, by the excellence of which the remuneration is regulated.

Lace Manufacture.

(This Chapter is by Dr. Ferdinand Stamm.)

The lace industry was introduced into Austria, and, in the first place, into Bohemia, from Saxony, where Barbara Uttmann, of Annaberg, in the year 1561, either invented, or, more probably, improved and developed the use of the lace bobbins. In 1792 there were 18,000 lace-makers in Bohemia, and the industry was generally cultivated in other parts of the Austrian monarchy, but this is now, by the introduction of the cheap machine-made laces, subjected to an overpowering competition that has restricted it to the limits of home industry; and it is only in the Bohemian Erz mountains that it is still an article of extensive manufacture. The official sketch of the social economy of the Austrian empire which was published in 1862, on the occasion of the International Exhibition at London, by the k. k. Ministry of Trade and Social Economy, gives the number of persons engaged in the production of ordinary laces at 8,000, and of the women manufacturing Valenciennes, point lace, and flat lace at 4,000. It may be safely assumed, however, that there are on the Erz mountains from 40,000 to 60,000 lace-making cushions, all of which, however, are only occasionally at work for a short time. Recently the laces made with the needle have been cultivated there, and by the introduction of good designs for the ornamentation of the lace a new impulse has been given to this art manufacture which will develop the lace manufacture of the Erz to a branch of industry occupying regularly its own class of workers. The style of manufacture of the laces varies much; common to all is a transparent ground with a pattern of coarser or more compactly arranged threads. The transparent ground can be made of a woven fabric by drawing threads out of it one by one, and leaving opaque parts for ornament, or by embroidery. This is the process adopted in Moravia and in the house industry of other countries of Austria.

Other methods consist in square-netting the ground or weaving it on the bobbin net machine in polygon, or sewing it with the needle or knotting with bobbins. Upon the ground so prepared the pattern or ornament is either woven in (as in machine lace) or knotted in with bobbins, on which the thread is wound like a spool (bobbin lace), or sewn in with needles (point lace), or embroidered in as an ornament ready made before-hand and sewn on (*appliqué* or flower sewing). The bobbins are three-inch wooden spools of the thickness of a goose quill on to which the thread is wound. The spool has a small button at the top which prevents the thread from slipping off. The lower part ends in a thicker knob on which a wooden socket is put to protect the thread from dust and from the worker's hot hand. The number of the bobbins, is regulated by the breadth of the lace to be made, for the narrowest lace there are at least eight bobbins with a thread on each, for the knotting of the reticulation, that the bobbin workers of the Erz mountains call *Schlag* (English "*lay*"). The reticulations that compose the ground of the lace vary, being narrow, broad, four and six sided, open or filled. This variety is already a pattern on the ground. Now several threads thicker than the rest are introduced on special bobbins and knotted in with the ground. The work is not easy to describe. Seeing a lace pillow worker for the first time with a 100 or more bobbins, which she separates by fours and eights between her fingers and throws about amongst each other, her hands seem to be merely stirring about wildly in the rattling heaps of bobbins, whilst the meshes grow into shape one by one from the whirl of intertwining threads. Every mesh is made fast to the pillow with a pin stuck into the

cover of red cartridge paper on which the design is traced and the holes prepared for these pins beforehand, and the intertwining of the threads is proceeded with. In this way, row by row the lace-maker works on, from right to left and from left to right alternately, and the work proceeds so rapidly that several ells of lace of the breadth of half an inch or an inch can be made in a day. The broader and more ornamented the lace the slower is the progress of the work. The earnings of the worker depend on her industry and dexterity, for all lacework is paid for by quantity. Price is regulated by the demand and the worker is almost always dependent on the lace merchant, who seldom raises the price to an equality with ordinary daily wages, because he knows that the lace-makers like better to sit at home in their houses than to work in the fields. It is but seldom, under the pressure of a great demand that the lace-makers earnings exceed a day-labourers' wages, and none but very dexterous workers can earn wages in which artistic talent is calculated in addition to industrious labour. In other parts of the monarchy besides Bohemia, as Moravia, Silesia, Carintnia, lace-making is still much cultivated. The great attention now being paid to the subject of technical education is introducing in this trade—a branch of house industry—a period of unprecedented development.

Manufacture of Hosiers' Goods.

Amongst the branches of manufacture which have undergone surprising development in process and proceeds this industry is prominent. A petty manufacture of ancient date, its transformation to a great industry, whose products influence the trade of the world, dates from the last few decades of the present century. With this phenomenon, however, the circumstance is remarkable that in the same ratio as the improvement of machinery increased the quantity of produce many fold, it opened to female labour an increasing field. Up to the third decade of this century the only machinery for stocking weaving was the invention of W. Lee in the 17th century. The performance of this loom was insignificant, by perpetual work it only produced about a dozen middling fine stockings or nine large jackets in a week. Female labour was not available for it, the unwieldy mechanism of the frame requiring the strength of a man. The bobbinet machine, originally intended for the manufacture of tulle and lace, sprung up in the course of the thirties (years), and was soon adapted for stocking weaving. The new machinery brought about radical alterations of many kinds. In the old stocking-frame the work was done with a single thread over the whole breadth, which seldom exceeded 50 centimetres, and the mesh of the stocking was formed by twisting it round the needle; but in the new frame, which is two metres in breadth, all the threads that form the texture are brought together on a beam as in the weaver's loom, and then twisted together on the needles. Whilst the production of pattern, broad, closely woven goods was difficult with the defective construction of the old machine, the new looms admit of obvious varieties of combination. Among their manifold productions we will first mention the cloth gloves and summer thread gloves generally made by women. The first process is spooling the yarn and winding it on the warp beam; in this girls of 14 years old and upwards are employed. Their weekly wages are 3½ to 4 florins. The weaving is always done by men. The finished work has to be carefully examined and faulty meshes made good. This laborious process requires a woman's care, the weekly wages are about 3 florins. The stuff having been dyed and finished the gloves have to be printed, cut out, and sewn; all woman's work, as well as the shaping, packing, and binding in boards of the gloves. In the same manner all sorts of coloured stuffs are prepared, some cut out hundreds of articles such as hoods, jackets, scarfs, shawls, gaiters, children's clothing, &c.; and in cutting out, sewing, and making up, women are employed, who are able to earn by such work from 2½ to 4 florins a week. But the loom invented by Jacquin and Fouquet of Troyes in 1840 was still more important. This first initiated the manufacture of large quantities, for it delivers from 80 to 120 pairs of stockings, and up to 25 dozen of jackets, &c. per week, and—what we

must particularly notice here—it is attended by girls, who manage it when working with motive power, or turn it themselves, as they can easily do without any particular effort, and earn weekly wages from 5 to 8 florins.

The sewing and finishing of the goods is of course also only women's work, so that altogether it may be said that the hosiery manufacture is almost exclusively carried on by women's labour. The manufactory of hosiers' goods at Teplitz employs 50 glove-makers, who work up at their own homes, with the sewing machine, the material manufactured in the establishment; also from 150 to 200 women, under female superintendence, who arrange patterns in combinations of colour and material devised by the managers; and further 100 women at the looms. The produce of the loom is here partly sewn in the factory, by sewing machines worked by steam. The increase of this industry has greatly benefited Teplitz and its neighbourhood (Bilin, Dux, Brux, Graupen, Osseg, and Oberleitensdorf) at which places live the people who find in Teplitz good and remunerative employment. It may be interesting to notice here the intimate connection that exists between the school and the factory. Most of the glove sewers of this factory live in Osseg, six miles from Teplitz, where there is a sewing school which educates a supply of the most excellent workers, especially clever in the finer branches of needlework, and it is in no small degree to this circumstance that the factory owed the possibility of introducing woven gloves into Austria in 1857.

An offshoot of the above is the work that may be called from the contrivance used "frame work," or from the process "knotting work." It deserves mention here particularly because it is woman's work exclusively, it is independent of machinery, can be done at home, is easy to learn and is very effective in result. Threads are stretched on a frame vertically and horizontally, forming rectangles, and the angles knotted together with other thread carried from angle to angle. The distance from each other of the hooks on the frame to which the extended threads are fastened determines the closeness of the texture, and the variations of the pattern are produced by the mode of carrying on the thread with which the angles are knotted. The knots or small balls that appear on the stuff are made by cutting away the cross threads when the knotting is done. When wool and silk are used they do not appear as weft and warp, but the silken threads are worked on to the wool which is stretched on the hooks of the frame. The peculiarity of this work is the geometrical figure that the cross threads take. They are inferior in elasticity to other worked goods and appear as children's hoods—at 3 florins the dozen—as neck-ties, shawls, and so forth. The work is easy and may be learned in a week at the most. Practice and sufficient experience, however, are required for the framing, and imagination and taste for the invention of patterns. The above-mentioned factory employs about 60 girls. A managing woman composes the patterns, which are given out with the materials to the girls. There are about 300 girls so employed in the neighbourhood of Teplitz and they are celebrated for their work. Their earnings may be calculated from the following data:—for a cloak 1½ days, 80 kreutzers to 1 florin; a child's jacket ½ day, 50 kreutzers; child's cap 2 hours, 10 kreutzers; hood 3 hours, 25 kreutzers.

Finally, crotchet work is mostly done at home, and is here an article of wholesale manufacture, the factory mentioned above, by the help of good railroad communications, employing from 60 to 80 girls of the surrounding villages. The girls fetch samples and yarn from the factory and bring back breast covers (bosom friends), child's hoods, jackets, &c., and earn on an average about 3 florins a week.

Manufacture of Netted Articles.

The introduction of this industry into Austria as a branch of manufacture dates from 1863. Up to that date netting, as of hair nets, gloves, &c., was a house industry, in the narrowest sense of the word, that is, it was done in each home for the use of that home alone. No novelty has been introduced in the work beyond the system of trade. One Vienna firm supported by commission trade employs from 3,000 to 4,000 girls and women, principally in Bohemia and Moravia. In addition to earnings by agricultural labour,

therefore, an average of 2½ to 3 florins weekly can be earned by this industry, mostly during the winter. The finishing, application of elastics, and fitting of the goods is done in Vienna. The earnings of these workers amount to 4 and 8 florins a week. The production not only supplies the home demand but provides an important article of export to the East, to Germany, to Russia, and to America. Raw materials are silk, twine, and iron wire. The relation of value between raw material and wages is as 1 to 6 for fine goods, 1 to 1 coarse goods, and the average 1 to 4. Very recently new articles have been added to this trade, such as window curtains; the hammocks of recent introduction may be usefully mentioned in this category.

Straw-hat Manufacture.

Women are employed:—1st, to stitch the hat, that is, to sew the plaited strips together in spiral lines. These strips are not only made of straw, but horse-hair, silk, flax, bast, cotton, and plaits of mixed material, are used for hat-making. The sewing is generally done on a wooden model; after long practice at the manufacture of one shape this is dispensed with. Weekly earnings vary from 3 to 10 florins, average 6 florins. 2nd. Washing, bleaching, and sizing hats, earnings 5 to 6 florins, average 5 florins. 3d. Adjusting or trimming hats for men and boys by sewing in the padding and the leather that encircles the head, the fillet, and the shade or rim of the hat. Sewing machines are commonly used for this last process. Weekly wages 5 to 6 florins, average 5 florins. 4th. Decorating or garnishing hats for women and girls, *i.e.*, sewing in padding and ornamenting the hats with ribbon, flowers, and feathers; this is in fact dress-makers' work. Weekly earnings from 3 to 10 florins, average 6 florins.

All the above employments, excepting washing, bleaching, and sizing, are sedentary, they tax the chest and the eyesight, but are not perceptibly detrimental to health, they require no special knowledge or dexterity beyond an ordinary faculty for needlework. Girls of ordinary intelligence learn to stitch straw hats in three months, and the same length of time is required to learn trimming and garnishing. The simple work of washing, bleaching, and sizing requires no special learning. The average of the ages of the straw-hat workers is 20 years, the youngest 14, the oldest but rarely 50 to 60. They mostly live near the factory, and belong to the middle and lower classes of the people, but on the whole to the better sort of these. Their employment is only active from November to July, their work is done partly in the factory and partly at their homes, partly for time wages, partly on piece contract. In the factories they work from 8 a.m. until 7 p.m. (but seldom on Sundays and holidays), with an interval of an hour at noon and half-an-hour at dusk. In Vienna about 1,000 workers, besides 150 men, are employed in the manufacture and finishing of straw hats; of whom 65 per cent. in stitching, 5 in washing, bleaching, and sizing, 15 in trimming, and 15 in decorating.

Straw Plaiting.

This is a branch of house industry exclusively carried on by children and women in the districts of Bohemia surrounding the foot of the Erz mountains and is of considerable extent. It was introduced from Saxony, where still the finishing and commercial dealing with its produce remain. The districts indicated, where the climate is harsh and the soil infertile, contain two conditions favourable to the development of this industry—abundance of suitable labour and of suitable raw material. About 1,000 children and women are employed whose weekly earnings range from 35 kreutzers to 2 florins 40 kreutzers; in isolated instances a plaiter earns as much as 70 kreutzers by one day's work. The value of the raw material used is estimated at about 9,000 florins, increased by the partial manufacture seven-fold. Ripened wheaten straw is used, generally only the middle and upper parts of each stem, the middle producing the coarse plait, and the upper producing the medium and fine plaits. The straw has to undergo a process of preparation before it is plaited. The colour is first rendered uniform throughout by the application of sulphur. The straw is then parted, split with an iron tool about half an

inch broad ending in sharp teeth. This tool is called *Reisser* (the tearer) and has from 10 to 18 teeth. The piece of the halm, after the sulphur process, being about 6 inches long, is split open on one side, laid upon a leather couch and scraped on the inside with a knife. This gives it uniformity of thickness. Then it is drawn under the "tearer." Only the parts successfully split are available. The plait is called 10-tooth plait or 18-tooth plait according to the number of teeth on the tearer. When the plait is ready it is passed through the sulphur process again and washed, and sent into commerce in pieces of 24 ells length. Spotted wheaten straw is dyed aniline red, brown, or black, and used for plaiting in colours. Bleached oaten straw is occasionally used, but it is decidedly inferior to wheaten.

As with wood carving, weaving, and other industries, a richer and remunerative development is afforded to this branch of industry by its cultivation in the schools. The people's school at Tellnitz, under the management of the teacher August Heller, produces plaits worked by children of 8 to 13 years of age, who do the pieces (of 24 ells) in periods of time varying between 10 minutes and 47 minutes. There were in the Exhibition specimens of a 10-tooth plait and a 12-tooth plait, both worked in 10 minutes, the former by a boy of 13 and the latter by a girl of 10; also of a 10-toothed plait worked by a little girl of 8 years old in 47 minutes.

Manufacture of Hat Bands.

Women are employed :—1st, in winding and spooling the dyed silk or yarn. The skeins are fitted on to reels, the ends of the thread passed through a glass conduit and attached to their respective spools, which, revolving on a spindle moved by a wheel, wind on the threads. The spools that hold the warp placed on a sloping frame fitted with twists, give off their threads through conduits to a perpendicular reel or warping frame, from which they are transferred to spools of a larger sort. The threads of the weft are transferred in a similar manner, but the spools are smaller. The women engaged at the spooling machine earn, on an average, from 4 to 4½ florins per week, at the winding machine 3½ to 4 florins. The women who attend the machines used for preparing the larger spools are paid 6 florins per week. 2nd, in setting up the loom and weaving. The narrowness of the band to be woven enables the weaver to weave 50 or even more bands at one time. This is the only respect in which this varies from ordinary weaving. The women employed at power looms for weaving hat bands earn from 4 florins 80 kreutzers to 6 florins a week, and in exceptional instances even more.

Manufacture of Felt Hats.

Women are employed :—1. To superintend the regularly equal partition of the hair according to the quantity to be used for each hat. 2. To spread out the hair in thin layers on a table so that the quantity introduced into the machines (the blast and fan machines by which the hair is scattered about in all directions for making the fur), is such as they are constructed to receive. 3. To felt or fold in wet cloths the loose material delivered by these machines and roll them to and fro until the produce has a certain cohesion. 4. To trim the hats, and in some factories to weigh out the material and pack the finished wares.

Felting requires great precision, a very light and steady hand and great activity of the arms, as one thick place in the bell-shaped form that the worker delivers diminishes its value. Care and patience are required in every step of this industry. The general age of the workers is from 17 to 24. For felting and spreading, with 10 hours daily labour the weekly wages are, in Prague, 3 florins 60 kreutzers, for machine sewing 4 to 5 florins. In Vienna the daily earnings are from 90 kreutzers to 1 florin 10 kreutzers. The apprenticeship to trimming is two years, for other parts five to six weeks.

Manufacture of Seamless Corsets.

The raw material is made of cotton yarn (warp in England, weft in Austria) in the ordinary manner, and being woven in concavity by men, is cut

off the loom, on which generally the material for 12 corsets is woven at once, and handed over to women to cut out, to insert whalebone, and to bind the corset, which then with some help of men is washed and dried, and then plunged in a boiling preparation of starch, glue, and wax, after which it is half dried in a centrifugal machine, and then spread on to hollow copper figures of the shape of a bust, which are heated by a jet of steam inside, and dry the extended corset in 1 to 1½ minutes. The finishing processes are ironing and sewing in elastic springs and eyelet holes.

The only employment among the above which is troublesome and exhausting is that attendant on the finishing, on account of the high temperature 36° to 38° (Reaumur). It is therefore given to two workers who undertake it and the care of the drying place on alternate days. The work is learned in about four weeks. The weekly wages in all departments are 4½ to 5 florins.

Manufacture of Clothes.

This branch of industry is always separating more and more into two distinct trades—1. The wholesale manufacture by tailors and merchants, for which, especially of men's clothes, several large exporting establishments have been recently created, partly manufacturing for themselves, partly employing the so-called piece workers, this last most extensively. 2. The making of clothes to order, an industry steadily dwindling away.

Women are but little employed in Vienna in making men's clothes, although they are well adapted for many departments of this industry. In the same way it would be a very good thing to employ women in the manufacture of ecclesiastical decorations and such things. But in the manufacture of woman's clothes and corsets, which are mostly shaped on Parisian or Berlin models, more women than men are employed. In some establishments there are only women, but, generally, there are certain tasks always given to men, and others to women. Women are most generally employed :— 1. As messengers to fetch and deliver parcels. 2. To wind the silk, wool, and twine, for the working sewing machines. 3. In needlework by hand or with the sewing machine. 4. Designing ornaments and cutting out material for clothes and finery. 5. As saleswomen, "trying on mademoiselles," cashiers, and book-keepers.

The messengers and the needlewomen must have strong constitutions, for the former have many stairs to climb, and the latter work twelve hours daily, for the most part with the sewing machine. Many crying abuses exist in the employment of young and weakly persons and in the practice of crowding many in badly ventilated and overheated localities, which call for correction. Ordinary intelligence and some previous knowledge of plain needlework being assumed, the employments of hand and machine sewing and cutting out can be learned in one year, or with special talent even in six months. The same of the design of ornaments, for which a previous knowledge of drawing is advisable. Most of the workers in this industry are between 18 and 36 year old, the youngest is 13, the oldest 45. They generally belong to the poorer classes of the people, but among those engaged in the two last-mentioned categories are the daughters and wives of officials of the higher sort, and of citizens. The taxed trade of Vienna (excluding the family dress-makers) employs 1,500 to 2,000 girls and women in this branch of industry; of whom 10 per cent. are messengers, 10 per cent. winders, 60 per cent. needlewomen, 10 per cent. cutters and designers, and 10 per cent. cashiers, book-keepers, &c.

Manufacture of Women's Ornamental Clothes, Milliners' Goods, &c.

This manufacture of hats, hoods, head-dresses, and similar objects, is chiefly entrusted to women. It is mostly copied from Parisian models, but often exhibits much taste. Good taste being presumed, the milliner requires no previous knowledge beyond the ordinary dexterity with her needle acquired at home. The apprentices take part in the manufacture of ornaments immediately on their entrance; they receive board, lodging, and clothing from

their employers, and are received at 14 years old for two years, and at 15 for 1½ years apprenticeship. Girls above 14, living at their own cost, and entering an apprenticeship of nine months, have to pay 5 florins a month for tuition, or for six months they pay 10 florins a month in advance. Most of these pupils only learn millinery for home use in their families; but their knowledge is available in case of changed circumstances as a means of support.

The working staff are classed as apprentices, workwomen, counter demoiselles, piece workers, and "mounters" (who finally decorate the goods with flowers, feathers, and such things). The patterns and cutting out are generally the manager's work. The day's work is so distributed that each woman in turn is employed according to her ability. Weekly wages, with board and lodging, range from 2 to 5 florins; average 3 florins. Without board and lodging from 4 to 10 florins; average 6 florins. The work is not severe and the workers are generally youthful; mostly from 14 to 24, and inhabitants of Vienna. The work is only interrupted in the transition from season to season, not longer than three months. The women living at their homes work 9 hours a day, from 8 a.m., until 7 p.m., with two hours rest at noon. The women living in the house work 11 hours a day, from 8 a.m. till 8 p.m., with one hour of rest at noon. Fifteen minutes' rest is generally allowed for tea-time. Extra work, very rarely, under great pressure, is given to the women to do in their own homes for extra payment. Besides the family needleworkers, about 3,200 women are employed by 800 taxed traders in this commodity; of these 40 per cent. are apprentices, 30 handworkers, 20 counter demoiselles, 5 piece workers, and 5 "mounters" or decorators.

Glove Making.

The general introduction of the sewing machine into this business has not diminished its employment of women and girls. Quite half of the work entailed by this manufacture is done by women, and the industry has both in quality and quantity made extraordinary progress during the last 20 years, and become an exporting trade. The number of women it employs in Vienna and Prague is considerable, as well as in Lower Austria, Bohemia, Moravia and Silesia, chiefly for account of manufacturers carrying on business in Vienna and Prague. Women are employed:—1. In sewing gloves, with glove sewing machines. This machine, called also a "Comb," is not to be confounded with the glove-making machines invented in recent years on an American principle. The old fashioned machine formerly used is meant, which cannot be called a sewing machine in the present sense of the term. It may be described as a regulator, which is constructed to produce a more even seam, setting the stitches at regularly equal distances apart, by making the needle pass between two metal plates in which a series of fine teeth fit into each other. The affair seems very simple, but it takes the worker a long time to learn to draw the thread against the tooth with equal strength at every stitch. With this the cut out parts of the glove are sewn together, the glove is bound, the button hole sewn, and the three seams on the hand. Nearly all gloves are made in the manner described, so that this part of the manufacture occupies 80 per cent. of the workers. The quality of the work varies, in spite of the machine, considerably, and only a fraction of it is faultless in seam.

The price paid for this work in Vienna varies between 16 and 26 kreutzers for one pair of gloves with one button hole; at which from 64 kreutzers to 1 florin and 4 kreutzers can be earned in a day's work. Gloves with several buttons are more expensive, up to 34 kreutzers the pair. In Prague the payment for a pair is 13 to 21 kreutzers.

2. *Sewing with an Automatic Sewing Machine* (Rudolf system).—The woman has in this work only to attend to the machine, and put before it the several parts in proper position. The machine is not so generally used as it deserves to be, but there is no doubt it will everywhere supersede the regu-

lator as soon as it is improved sufficiently for the finest sewing. The earnings of the worker with this machine are very much larger, for industrious and skilfully used it makes 10 to 15 pairs of gloves in a day, and some women can make 20 pairs with it. The price for the sewing remaining unaltered these women can thus earn 2·40 to 2·80 florins per day. The weekly earnings made in Prague with this machine reach from 7 florins 20 kreutzers to 10 florins.

3. *Tambouring the Gloves with Silk* to give the seams on the back a greater fulness is nearly always done to gloves for export to England and Holland. Holes are punctured for the stitches with a fine-toothed instrument in single, double, or triple rows, and the cut-out glove being stretched on a frame strong silk is drawn through them with a crochet needle. This system is much in vogue with the medium fine sorts of gloves, and the work is remunerative, the pair being paid with 5 or 6 kreutzers, one person easily sewing 36 pairs, and thus earning from 1 fl. 80 kr. to 2 fl. 16 kr. in a day.

4. *Quilting the Gloves* is a peculiar mode of sewing them, the leather pieces being placed not in juxta-position, but one on the other, the seam thus made being more durable. This can be done by hand, or with the American double chain-stitch sewing machine. In both cases the daily earnings of the worker are from 1 florin to 1·20, or, if she is skilful, 1·80 florins. In Prague quilting a pair of gloves is paid with 73 to 75 kreutzers, and an industrious woman can work three pairs a day.

Continuous work at a sewing machine is detrimental to the lungs, and entails all the other evils attendant on a sedentary life. Women of many classes of the people work at glove-making at their homes. Their usual ages range from 20 to 40 years. Many of them pursue this only as a supplementary occupation. Their number may be estimated at 5,000 to 6,000.

Manufacture of Body Linen, and Similar Articles.

Women do the needlework, and plain embroidery. The former requires an apprenticeship of one year, more or less, according to progress; the women employed are of all ages, the work is generally done at their homes, and they work, with pauses of rest, 9 or 10 hours a day. Hand needlework, apart from its sedentary character, does no injury to health, machine work, on the contrary, is prejudicial if prolonged. The women working at their homes are paid by piece. Those employed in places of business receive from 4 to 8 florins, skilful needle-women earning as much as 10 to 12 florins a week. About 3,500 to 4,000 workers are employed in this manufacture in Vienna and its suburbs, of whom 80 per cent. are needle-women.

Technical education, it is urged by those concerned, is necessary for this branch of industry, and it is recommended that it be promoted in prisons and reformatories, in some of which it is already adopted. Some beautiful specimens of body linen and embroidery were exhibited in the Pavilion for women's work.

Manufacture of Bedding.

In this branch of manufacture, which includes the preparation of mattresses, coverings, bolsters, and all other bedding furniture, women find a rich field of labour. They are employed:—1. In sewing the upper and lower parts of the cover together, to be finished (stuffed) by men; weekly wages 3 to 4, average 4 florins. 2. Stitching mattresses and bolster covers; wages 4 to 6 florins, average 5 florins. 3. Sewing bed-linen, still principally done by hand. Skilful needle-women are in request for this article; wages 5 to 8 florins, average 6½ florins. This is done at the home of the worker. All the above are of course sedentary occupations, trying to eyesight and chest, and requiring previous ability to sew. Most of the woman are between 16 and 30 years old, but many are much older. Some of the girls live at the manufacturers' house, but the majority with their parents and relations. Many wives of public officials and pensioners take in such work to do at their homes. The employment continues all round the year, in the quiet months stores

, are collected. The hours of labour are from 7 to 7, with an hour of rest at , noon, and 15 minutes at 4 p.m. About 300 women are employed in Vienna; 20 per cent. upon the coverlids, 30 on the mattresses and bolsters, and 50 per cent. on the linen of the bedding.

Cravat Manufacture.

Women are employed to design, cut out, and sew the cravats by hand or machine, and to manage the details of the business and books. The highest wages earned, depending on the skill of the worker, are 7 florins, the lowest 3 florins, the most usual 4 florins. About 600 women and 100 men are employed in Vienna, of the former of whom 97 per cent. are hand or machine needle-women.

Shoe Making.

This is at present a subject both of factory manufacture, and retail industry. In the latter the shoemaker working by measure is assisted, both with upper leathers and sole leather, by wife or daughter, insomuch that the number of women thus engaged cannot be estimated. In the factories, however, division of labour is introduced, which has opened a wide field to female industry, to be undoubtedly extended with the increase of the application of machinery. At present women are employed in:—1. Quilting with a machine, that is, stitching together the pieces of the uppers arranged for the machine, and quilting ornaments on to the leather and stuff. The work is laborious, and therefore only women and full-grown girls are employed. The apprenticeship lasts from three to four weeks, and the weekly earnings range from 8 to 16 florins. 2. Arranging the separate pieces and fastening them together before they come to the machine; also finishing the uppers delivered by the machine, making button-holes, &c. This work is easy, the probation lasts 8 to 14 days. Some of the work is done out of the house, and the weekly wages are from 5 to 8 florins. 3. Pasting together the cut out parts for the machine to sew. The work is not hard, but requires great precision, and until recently has been given to men. The apprenticeship lasts four to six weeks, and the weekly earnings are from 6 to 8 florins. 4. Making ornaments, rosettes, &c., for ladies' boots, and sewing them on. This is easy work which young girls can do. They are instructed for 8 to 14 days, and then paid from 3 to 8 florins a week. 5. Packing the finished boots and labelling the parcels. The work is learned in a few days. The weekly earnings are 6 to 7 florins.

The number of women employed in this industry cannot be accurately calculated. One factory employs about 3,000 workers of whom 510 are women and girls. There are in Vienna 4,000 master shoemakers who have 9,000 apprentices; from which it may be estimated that they employ 1,200 or 1,500 women and girls.

Manufacture of upper leathers for shoemaking, with sewing machines, and on a large scale, is a new and very promising branch of industry already supplying an important export trade.

The women employed in quilting upper leathers and lacquered toe-pieces by means of sewing machines are paid, for the toe-pieces, of which they can produce five to eight dozen in 11 hours' work, 30 to 70 kreutzers the dozen; for upper leathers, plain, for children's boots 70 kreutzers, and for ornamental as much as 3 florins per dozen. Of the former three dozen can be produced in a day's work, and of the latter about a dozen. On an average the earnings in the factory are from 7 to 9 florins, and at home 7 to 8 florins a week.

Women employed in other parts of this industry, at easy work with a hand machine, earn from 4 or 5 florins a week.

Manufacture of Artificial Flowers.

This branch of industry is for the most part carried on by the labour of women. The materials most generally used are:—woven stuffs, especially cambric, gauze, muslin, crape, mull, satin, taffetas, atlas, woollen and silk

velvet, papyrus, silk, cotton, paper, raw and rolled india-rubber, feathers, glass in the form of fruits and dew-drops, and many natural objects, such as the tufts that contain the blossoms of the blue cornflower, the small seed capsules of the wild poppy, a number of grasses, mosses, seed corn, and small branching twigs from trees and brambles, and from the insect world green rose bugs and blue "opal chafers," the Cassida or "helmet beetle," and Buprestis or "burn cow." The woven stuffs are stamped with punches into the shape of natural leaves. The scissors are only used in the lack of punches, and for correcting irregularities. The curls, veins, and other inequalities on the surface of the leaves are imitated by various processes, among which embossing is the most effective. The green leaves are punched and embossed out of prepared green stuffs, in finer work, shaded with paint, then covered with fluid wax, and japanned or dusted with meal which imitates hoar frost. Embossing is done with metallic stamps, of which a considerable collection is required for the great variety of the leaves to be produced. The upper part of the stamp is warmed, one or more leaves are placed in the lower part and the whole is compressed with a screw. Some manufacturers confine their attention to the production of leaves, which are sold to the flower makers in packets generally containing a gross. Flower leaves are sometimes embossed, but not often, because of the uniformity of result. Other tools used moderately warmed are beak shaped tweezers, &c., &c. In the composition of the flowers the centre is first arranged, and the work continued outwards to the green leaves on the stalk which is of iron wire. The ribs of the leaves are of thoroughly heated, and therefore soft, iron wire. Paste and gum-arabic are used for joining. The petals are made of fine yarn starched and dyed and cut by machinery into equal lengths, the ends of which are repeatedly dipped into a preparation mixed of colour, starch, and gum until they hold a ball resembling the natural seeds of the flowers. In many kinds the required imitation is finished afterwards with colour and gum. Buds are usually made of the same material as the flowers to which they belong, but for buds of oranges glazed leather is used. The buds are generally stuffed with cotton. Finally the leaves of flowers generally require to be finished by painting with the brush. The principal colours are rose, which is made of rouge (extract of safflower), and carmine, for which fine powder carmine is used.

In Vienna the persons engaged in this occupation are mostly young girls of 13 to 14 years from Lower Austria, Bohemia, and Moravia; children of parents engaged in business in the country and of peasants. Their previous training is unfortunately very meagre, and they seldom have any knowledge of drawing or painting. The universal practice is to admit them without premium as apprentices, living entirely at the cost of their employers for four years, or living at their own cost for three years. They have to learn every process, and their subsequent wages are determined according to their general capacity in their occupation. These vary from 12 to 30 florins a month, average 15 florins, with board and lodging. The greatest part of the work is done at the factory; only the larger manufacturers give work to be done elsewhere. The hours of work are from 7 to 7, with the customary intervals of rest. There are at present about 400 firms engaged in this manufacture in Vienna, employing from 1,800 to 2,000 female workers, of whom a third are apprentices.

Manufacture of Ornamental Feathers.

The colouring is done by men, the other processes mostly by women. The manufacture is frequently combined with that of flowers. African ostrich feathers are most usually manufactured. These are white, black, grey, and dappled, and are classified according to quality, as prima, secunda, &c. Other feathers frequently worked are those of the white heron, bird of Paradise, and Maraboo (there are genuine Maraboo feathers and false). The white prima ostrich feather is the finest of all. The feather is cleaned first by a cold soap bath, well washed twice or thrice, and then put into warm

soap baths, afterwards well washed in cold water, then blued a little, pressed, and swung to and fro in the air until the hairs have spread and the feather is quite dry. Next, with a small sharp knife, the strong rib at the back is cut away. The feather loses its stiffness and acquires pliability. With small feathers this is obtained by scraping the rib with glass. Then the hairs on each side of the rib are made to curl in, with a blunt knife, and the requisite uniformity of shape is given them by combing them over a slightly warmed iron. Next, in order to hide the rib, the worker, with a blunt knife, twists here and there some hairs of the feather spirally over the rib until it is completely concealed by them. The feather is then threaded with a wire, folded in paper, and so completed. The same process is followed with grey and black ostrich feathers, except that the grey are generally, and the black always, coloured. White feathers are only coloured for some particular fashion of colour, as blue, rose, violet, &c. If the hair on a feather is not dense enough, or the feather is defective, then two or three feathers are sewn together and then curled. This is done with both short and long feathers. Long feathers are called "leaf feathers," "amazons,"—short feathers, generally of three in a bundle, are called "panaché." Single and sewn feathers are distinguished in both. The hair of the ostrich feather is also much used for the manufacture of fancy feathers: cockades, fringes, tassels, &c., are made of these. The feathers are turned by a machine, and then joined to the hairs of other feathers. These combinations are called "pleureuses," and pieces of ostrich feather are sewn together to a length of some ells, and called "bordures," and used to decorate dresses.

There is an American ostrich feather called "vulture" which is worked like the African, but is inferior to it in quality. Tempting white down feathers called Maraboo are much worked. They are used for fancy feathers, the points of small white or coloured pigeon's feathers, and very small fragments of silk and the like are joined on to them. "Bordures" for ball dresses are made of them.

Conditions of labour, wages, &c. in this industry are the same as in the artificial flower manufacture. It employs about 240 working women and apprentices in Vienna.

Preparation of Feathers for Beds.

The raw feathers are brought from Bohemia, Moravia, Silesia, Galicia, and Hungary, and separated as unbroken feathers, down, and stripped feathers. The unbroken feathers, called in trade "pulled feathers," have to pass through several processes before they are fit for their purpose. First they have to be separated from the wing feathers, then sorted partly by hand, partly by machinery, and finally cleaned. The raw material contains a quantity of dust and sand, having been originally plucked in a barn or yard and then swept together and packed. The feather gains brilliancy and elasticity in the cleaning process, this is a system of movable sieves and steam washing, and requires the greatest care and most attentive watching. After cleaning it is made perfectly free from odour, finished, and finally coloured. By this process its value is greatly increased. Feathers cleaned by machinery lose much of their elasticity.

The feeble old women usually employed in sorting earn from 40 to 50 kreutzers a day, needle-women 50 kreutzers, workers who attend to the machine, pack, &c., 60 kreutzers.

Manufacture of Fezes (Turkish Caps).

Females are employed:—1. *At the twisting frame*, especially in the twisting of the thread that is to be manufactured into Turkish caps. The work of the attendant on this machine is, first, to set up the bobbins, of which there are from two to four, according to the size and quality of the caps to be made. When the bobbin is wound off a fresh one has to be set up, and the principal duty of the attendant is to see that the proper number of threads are twisting, and when this is not the case, to stop the machine and join on the broken threads. Much of the effectiveness of the machine depends on the skill of the attendant, and the weavers' work is so much dependent on her that it is a common thing for them to stipulate that they will only work with the yarn produced by a certain attendant whose skill they can rely upon.

2. *At the machine for shaping the cap.* This is a rod heated by steam on which the fez, after it is dyed, has to be fitted. The work is simple, but requires great precision, the shape of the fez must not have any irregularity, and the insertion where the silken tassel comes has to be fitted precisely into a hole in the cover, which is also heated by steam. When the fez is in the exactly right position between the shapes, the attendant presses the cover on to the rod with the requisite force, by means of a screw. The cap remains under the press between three minutes and five, and a clever girl can therefore attend to three presses at once.

3. *At the machine for marking the fez in gilt letters.* When the cap is of the required shape gilding powder is strewn on the place to be marked, a piece of gold leaf laid over it, and an impression made with a stamp heated at a gas jet and pressed on to the cloth by a screw. One attendant is stationed at each machine.

Manufacture of Woven Coverlets, Carpets, &c.

The only peculiar process in this manufacture is that which is called "knotting" the carpets, which are not woven but made by a process resembling embroidery. Taste for colour, skill, and knowledge of embroidery are required for this branch of female labour; the apprenticeship lasts a year. The work is sedentary, the eyes and the chest are most taxed by it. The average of weekly wages is 6 florins 50 kreutzers.

Shawl Manufacture.

One of the most important branches of pattern weaving in general, but especially of this branch of textile industry, is that called "reading" the pattern. The pattern has been made by the designer on a small scale, on paper. To transfer the pattern to the web, the Jacquard loom—adapted as it is for the most complicated patterns conceivable in weaving—requires an intermediate stage, rendered necessary by the ingenious contrivance of the loom. This intermediate pattern is called the card. The importance of these cards will be understood from a short description of the Jacquard loom. Every texture is composed essentially by the crossing of two threads, the warp and the weft. Setting aside the patterns made in the making up, all other patterns are formed by the repetition in a certain succession of the passage of these two threads over and under each other. This process of elevating at regular intervals certain warp threads demands extreme care, and is simplified by the Jacquard loom. The warp threads are attached to a needle, and with the motion of the loom this needle is kept in contact with a stiff roll of paper, perforated on a certain plan, and winding over a roller in the upper part of the loom. While the paper passes over the needle nothing occurs to it and its warp thread, but when a hole arrives the needle passes through, the warp thread attached to it is raised, and the thread of the weft shoots in underneath it. Now in order to prepare the paper roll or cards

or to make the necessary holes in it for the required pattern, the pattern coloured by the designer, having been enlarged, has to be "*read*," that is to say, the points where the weft lies uppermost have to be marked upon it. It is needless to say that this reading requires strained attention.

Cleaning or burling and washing the fabrics. When the superfluous parts of the figure-weft on the wrong side of the shawls, &c., have been cut off by the machine for that purpose, the remaining down is carefully brushed away, inequalities and knots in the weft or doubled threads are removed with the burling iron or pick pincers, broken threads are arranged, in short, the fabric is cleaned. After this it is passed piece by piece through warm water containing a solution of soap or other substance which gives it supple flexibility, and makes the colours brighter. The water is removed by centrifugal machines, and the fabric is then brought to dry in an apparatus that consists of a copper cylinder, turning on an axle, and heated inside with steam. The drying is done in a few minutes. All other processes in this manufacture resemble those that occur in other kinds of weaving.

Worsted Manufacture and Dye.

The most important establishment in Austria-Hungary for this branch of industry is the Worsted Manufactory at Voslau. The following processes occur in the manufacture:—

1. *Sorting the wool.* The wool grown in many countries in Europe comes from London and Antwerp in grease, half washed and sometimes thoroughly washed, and is sorted in the factory by girls exclusively of ages between 15 and 18 years. The work for which fineness and length are criteria requires decision of judgment and great care, that the sorts, from each of which a separate number is to be spun, may be nicely separated. All wools are generally sorted in long wool and waste. Good light being indispensable, the work is only done by daylight. Generally two girls work in company, and are paid according to the weight of the wool, from 25 to 35 kreutzers the 100 pounds. Their average individual earnings are 3½ florins a week.

2. *Willowing and washing.* The latter, in three or four soap baths at 40° temperature, is hard work and done by men. But girls and women are employed to help in bringing and removing the wool, &c. They are hired as day labourers and earn 3½ to 4 florins a week.

3. *Carding* the washed and partially dried wool. Most of this work is done by men, but girls and boys are employed to spread the wool on the supply cloth.

4. *Combing* the wool on machines constructed on various systems: ironing and attending the machine that transforms the fleece to a sliver is done by full-grown girls. All the operations in this group consist in attending to machinery and do not require any exertion of the strength. The wages range from 4 to 4·50 florins a week, in some case to 5 florins.

5. *Slubbing* the combed wool in a series of machines, is also an easy task, and requires no quality but attentiveness to the regular working of the machines. Wages 4 to 4½ florins a week, in some cases more.

6. *Spinning* or *finishing* the wool after the last-mentioned process is done either by hand mule-spinning frames or self-actings, to which men and boys are employed. But there are also water machines on which warp thread is spun, and these are attended to by girls. The work only consists in putting on, joining broken threads, and taking off. Wages 3½ to 4 florins the week.

7. *Twining* the spun yarn. Two, three, four and more fold is also done by machines attended to by girls and women. Wages are regulated by weight, and industrious hands, who keep the machine well going, can earn up to 5 florins a week.

8. *Reeling* spun or twined yarn and dyed yarn is done on reels moved by machinery. A high degree of dexterity is required for binding a certain regular number of threads according to the construction of the machine into skeins, and practised *reelers* do this with incredible rapidity. They are paid by quantity and weight, and earn, according to their skill, from 4 to 6 florins a week. Here also we must mention spreading and folding into papers the

finest dyed yarns, a handiwork which is paid by weight and requires dexterity and precision.

9. *Dyeing* the yarns in the dyeing apparatus, which produces 1,700 shades of colour, washing them, boiling, drying, &c. is done by *men.*

10. The reels of yarn, weft, warp, and twine intended for hand-loom weaving are made up in 10 lb. packets by *men.* The yarns from the spinning machines for power-loom weaving are deposited in boxes containing 200 to 250 lbs. by *girls.*

11. Sockets of the shape of a paper cigar-holder, called Cannette's, are required for power-loom weaving yarn, to be set up on the spindles of the spinning machines. The yarn is spun on these sockets, and they are put in the shuttles. The manufacture of these sockets is done in the Voslau factory by a number of machines, attended to by women and girls, who are paid by the piece, and earn from 3 to 4 florins the week.

12. The other parts of this manufacture are done by men and boys.

The factory at Voslau employs altogether 285 girls and women, of whom 59 are less than 16, and 226 more than 16 years of age. In all Austria-Hungary this branch of industry employs about 1,500 females. The process and division of labour is uniform in all the factories. The wages on the whole are very nearly exactly the same as those mentioned above.

Cotton Spinning and Weaving.

The conversion of raw cotton into thread or textile fabric involves the following processes :—

1. Loosening and cleaning the cotton.
2. Carding and stretching the fibres.
3. Roveing.
4. Spinning.
5. Reeling and preparing for distinct purposes.
6. Twining.
7. Weaving.

Each process contains separate operations, of which those are mentioned below in which women are chiefly or exclusively employed :—

1. *Loosening* and *cleaning* the cotton involves :—(*a.*) Mixing, to get rid of the inequalities of thickness of separate bales which result from the pressing. The tightly-pressed bales are opened by men, and the cotton is loosened by the women with their hands and spread out in layers horizontally laid one on the other. (*b.*) Weighing out a certain quantity determined according to the fineness of the yarn required, and spreading out this quantity on a fixed length of the feeding cloth of the cleaning machine.

2. *Carding* and *stretching.* The first, a cleansing process, is done by a machine automatically, which is attended to by men. Stretching or laying out the fibres parallel is done on so-called drawing frames, in which the separate cylindrical masses, as they come from the carding machine, are laid together, and drawn into thin bands of uniform thickness by passing between rollers revolving at unequal velocity. One woman attends to 12 or 15 of these drawing frames. She is materially assisted by an ingenious automatic arrangement of the machinery, which brings it to a standstill when the band ceases to pass through it.

3. *Roveing* is done on the spindle roving frames. On the first of these, the coarse roveing frame (called also slubbing or slabbing frame), the bands are stretched as they come from the drawing frame on one side, and the threads twisted during the transit are wound off on reels on the other side. On the others or finishing fly frames (roveing frames), of which one, two, or even three are provided, according to the fineness of the yarn intended to be produced, the reels from the coarse roveing frame are set up, the thread is passed doubled through the machine, then drawn again, and having been made finer in the process, is wound on to a smaller reel. One spinster assisted by a girl who sets up the reels, generally attends to two spindle frames of 120 to 160 spindles each. The so-called slub (slubbing or roveing) reels are then taken to.

4. *The finishing machines* (self-actors), which are always attended to by men.

5. *Reeling* and *making up.*—The cops (or bobbins) delivered by the finishing machine are either laid in boxes for power-loom weaving, for which little girls are mostly employed, or they are made up in hanks for hand-loom use and tied together in skeins, both operations being done by women; they are then compressed into bundles by men and packed.

6. *Twining* or *doubling.*—This operation contains the following processes:—The bobbins or cops that come from the finishing machines are unwound and the yarn wound on to large wooden reels. The attendant has to join the threads that break. One girl can overlook from 30 to 50 spindles. The filled reels are then set up on the twisting frame, and are twisted together twofold, fourfold, sixfold, or more by the so-called throstle spindles. The girl in attendance on the twisting frame has to be careful that there is not a thread wanting of the separate reels. Younger girls remove the reels from the spindles when they are filled. They are then unreeled or wound off and made up in hanks and skeins, which, generally bleached by a chemical process, are partly made up in smaller parcels by girls, partly wound into balls by machinery, and prepared for sale and packed.

7. *Weaving* includes spooling or winding, warping, dressing the warp, heddling (or passing the threads through the eyes of the needles), and weaving properly so-called. All these operations but heddling are done by machines, and all the machines but that for dressing the warp are managed by women. Spooling, like twining, consists in transferring the yarn from the bobbins to large wooden reels, which are then set up on the frames of the warping machine which gathers these threads together on to a cylinder for the dressing machine, and is attended to by a girl. The separate dressed threads are then heddled by a little girl into the so-called "mounting" (or reed, slay or sley), a part of the loom; or they are twisted on to the ends of threads already in use.

The care of a power loom, which consists in plain weaving only, in joining broken weft threads, or setting a fresh bobbin in the shuttle, falls well-within the sphere of female labour. A moderately skilled woman easily overlooks two looms, and a clever woman in plain weaving can attend to three. But all weaving establishments have hitherto employed men as well as women at the looms, and this arises from the circumstance that so many men formerly engaged in hand-loom weaving were originally taken over to the machine work. On the whole the conditions of this branch of labour are in a sanitary point of view very favourable. The strength is not taxed, and the conditions of light and ventilation are all that can be desired. Cleanness and neatness are the principal elements of excellence required of the women employed in this branch of manufacture.

Weaving in Colours is becoming an independent branch of textile manufacture, extensively developed in Vorarlberg and Bohemia, where it gives employment to a great number of women between 14 and 50 years of age. Daily wages in Vorarlberg range from 40 to 90 kreutzers, in Bohemia wages are from 3 to 6 florins the week.

Spinning and Weaving of Linen.

The processes resemble those already described so closely that repetition of their description is unnecessary. The manufactory of Albert Neumann & Son at Bielitz, employing 500 women, distributes them 19 per cent. in hackling and preparing the flax, 9 per cent. in assorting it, 40 per cent. in spinning, and 13 per cent. in winding. Women of 40 up to 70 years of age are employed at sorting, from 25 years upwards at winding, and from 20 years at preparing the flax; for fine spinning, however, only girls from 14 to 18 years old are employed. The wages for hackling vary from 50 to 70 kreutzers, for sorting from 35 to 38 kreutzers, for spinning divided into four classes from 25 to 50 kreutzers, and for winding 45 kreutzers per day. Weaving is entrusted to none but experienced skilled hands, who are paid according to the amount of the work they are able to perform.

Jute Manufacture.

The conversion of jute into yarn and textile fabric is an industry, introduced into Austria a few years ago and since then rapidly developed, which offers a great field for the employment of women. The whole of the work, from the sorting of the raw jute and its preparation for spinning, the spooling, weaving, and finally the sewing of bags for grain, meal, and other produce, could be exclusively and with great propriety performed by women. The labour requires no bodily strength, but consists in one part in the careful attention to an automatic machine and the joining of broken threads, and in the other part in hand and machine sewing, a peculiarly feminine employment. It is all done in lofty and airy rooms lighted from the roof and perfectly free from dust. The process is the following :—The raw jute, pressed into bales of about 300 lbs. weight, is brought into the sorting room by men, the bales are opened and delivered to the women employed for sorting, moistening, and oiling the jute. Sorting requires great attention and can only be properly done by an experienced person. The women employed in this earn about 5 florins a week, being engaged for ten hours a day. The raw jute, arranged by this process in hanks, then passes a series of processes all of which are performed by machinery managed by women : these are paid from 3 to 6 florins a week. The spun yarn is beamed on the heavy warp beams by men, but the heddling is done by little girls, and the power looms are most commonly managed by women. The weaving women, of whom a certain degree of skill is demanded, can earn from 6 up to 12 florins a week. The texture is examined and cleaned by women; but the finishing off, which consists of cropping, sizing, and mangling, is attended to by men. The finished fabric is again passed over to women to be sewn into bags, partly by hand and partly with the help of sewing machines. This work is generally given out to the women to do at their own houses. The "Erste Oesterreichische jute spinning and weaving mills" make more than one and a half millions of sacks in a year, for which they pay about 30,000 florins in wages.

Although jute manufactures of English origin have been generally known and used for a variety of purposes for a number of years, the fibre was not manufactured here until quite recently. It is true that individuals in Moravia, and in the north and north-western parts of Bohemia, have been engaged in weaving jute yarn brought from England and from Brunswick, where there is also a jute spinnery, and they have generally mixed it with flax tow yarns; but the raw material was not spun in Austria until two years ago, when the "Erste Oesterreichische jute spinnery and weaving mills" were established in 1870. This has been followed by a second at Floridsdorf near Vienna. The former, at Simmering, works 35,000 Zollcentners of jute in the year, of which it derives part from England, but the great portion direct from East India. It employs 600 hands in the factory and 400 at their homes, most of the latter being occupied in sewing bags. The jute is spun on 45 throstle spinning machines, with the necessary appurtenances, and 2,840 spindles, and woven on 147 looms from 36 to 94 inches in breadth. All articles which it is possible to manufacture of jute are produced here, from the thinnest packing cloth to carpeting, from the coarsest hop pockets to the finest meal bags. The machinery is driven by two horizontal engines on Corliss' system, of together 325 horse power.

The market for the goods is extended through the whole monarchy; the corn and meal sacks mostly go to Hungary. The export to the East is important, and the mill has connexions in Alexandria, Cairo, Smyrna, and other places.

Manufacture of Waterproof Cloths.

The only women's work in this branch consists in the sewing together of parts. This is partly done by hand, partly with the aid of the sewing machine; about 15% of the women employed work with the machine. These earn from 7 to 12 florins a week, or an average of 8 florins; those who sew by hand earn from 4 to 6 florins, or an average of 5 florins. They work 10 hours a day. The work can be learned in a fortnight. It requires strength of constitution, as the use of the sewing machine is injurious to the chest and

feet. The majority of the workwomen are between 18 and 40 years of age they come from the neighbourhood of the manufactory, and are nearly all married. In Vienna this branch of manufacture employs at present 50 women.

Manufacture of Oil Cloth and Leather Cloth.

This is severely hard work, unfit for women. In some oil cloth manufactories, however, women are employed, earning $3\frac{1}{2}$ to $4\frac{1}{2}$ florins a week, in preparing the raw material for spreading open.

Silk Weaving.

The women engaged in this branch of industry, which begins with the delivery of the silk yarn, and ends with delivery of the woven fabric, are,—

1. "*Magazineurinnen.*"—They arrange and distribute the work, weighing and booking the produce, before and after each process, and control the quantity. They have to select the silks intended for each stuff, and are of course the most intelligent and skilled of the employées.

2. "*Capolirerinnen,*" who prepare the silk yarn for dyeing, and deliver the dyed yarn to hewinders.

3. "*Winders,*" who wind the dyed skeins on to bobbins or large reels. The weft yarn they deliver to the

4. "*Spoolers*" to be wound on to small spools. Their work is fatiguing in the case of their having to supply motion to the machine, otherwise it requires nothing but dexterity. If the weft has to take up more than one thread, a new operation comes in called doubling.

5. *The* "*warpers*" receive the bobbins which are filled with warp. thread. Warping is done in the following manner:—The warp thread of about 40 spools is freed from them, and wound on to the reel or warping frame, which continually revolves, in sufficient quantity for the intended stuff. The work requires trustworthy carefulness and some experience. It is not fatiguing, and more interesting than that of winding or spooling.

6. *Weavers.*—Women are universally preferred for this work for the lightness of their hand, and the only weaving not given to them, is that which requires the strength of a man. The weavers must be fully acquainted with their complicated apparatus, the loom, and possess no ordinary degree of attentiveness and steadiness. Their function with power looms is scarcely more than the setting of the spool in the shuttle. One woman can conveniently attend to two looms at the same time, each of which will manufacture 60 ells of stuff in a week.

7. Two other employments connected with the loom are also allotted to women, namely, the preparing of the loom, and the so-called "heddle knitting" or arranging the heddling. The wages, or in the case of piecework the earnings, in Vienna of the "Magazineurinnen" amount to 8 or 10 florins, of the winders and warpers 6 to 8, of the weavers 6 florins, and of the other women employed in this branch of industry $5\frac{1}{2}$ florins a week.

Manufacture of Silk Ribands.

Like other branches of textile industry, this branch employs women:—

1. *For Winding*, girls of 14 to 16 years of age, at wages of 2 to 3 florins a week. Their apprenticeship last four weeks.

2. *For spooling and warping*, girls of 16 to 18 years of age, at wages of 3 to 4 florins a week; apprenticeship four weeks.

3. *For weaving*, girls of 18 to 24 years, wages 4 to 6 florins; apprenticeship generally six months.

4. *For putting up the Ribands*, girls of 16 to 18 years, wages 3 to 4 florins a week; apprenticeship four weeks.

Leather and India-rubber Industry.

Morocco Leather and Front Shades of Caps.

Girls and women are employed—

1. *In spreading and drying the dyed Skins.*—When the hides come out coloured from the dye they require to be spread upon frames of about 4 feet square. Two girls are employed for this, who make the skin fast with strong pegs hammered into a piece of wood of 2 inches breadth. The work goes on so rapidly that two girls are able to frame out as many as 40 dozen skins in a day, for which they are paid from 6 to 8 kreutzers per dozen. No previous knowledge is required for this work; dexterity can be acquired in a fortnight or three weeks. The stretched skins pass into a chamber warmed with hot air, where they are turned by adult girls to expedite their drying; these are paid 5 florins a week.

2. *Trimming, moistening, and polishing the Morocco Leather.*—The dried skins are put to the trimming machine, which cuts off the borders perforated by the wire pegs. Two girls are employed at this, and are paid 4 florins a week each. The skins are next moistened with white of egg with a sponge by young girls, who are paid about 2½ florins a week; and they are then polished by a machine attended by girls. This work is not hard; the apprenticeship lasts about a month. Care is necessary that the fingers may not be caught by the machine. The weekly wages are 3½ to 4 florins.

Manufacture of Shades for Caps.—The shades, already cut out, are bordered with thin leather, which is then sewn on with the sewing machine. This work requires practice, but a girl can learn it in a week. The girls so employed earn 3 florins a week. Sewing the corners with the sewing machine requires 2 girls, who work about 100 dozen daily, earning 5 to 6 florins a week. The learning to use the sewing-machine occupies the girls about four weeks. The workers employed in this branch of manufacture vary in age from 15 to 30 years, but there are older persons among them, mostly wives of men employed in the factory. The girls and women employed in the factory under consideration are,—12 stretching, 4 drying, 2 trimming, 20 moistening, 22 polishing, and 5 on capshades; total 65. The hours of labour are 10½ daily. All the work is done on the premises, which are lofty and well ventilated, and thoroughly warmed in winter with hot air.

India-rubber Goods.

In the factory at Wimpassing (District Gloggnitz), the only establishment in Lower Austria which pursues the wholesale manufacture of india-rubber articles, there are many ways in which employment suited to their capabilities is found for women.

1. *Manufacture of India-rubber Shoes.*—The india-rubber shoes, overshoes, or goloshes, come into the hands of the working women in from 7 to 12 pieces, to be made, without the help of machinery, into shoes by joining on lasts. In this process the inner lining of gummed "tricot" is first stretched over the last; next the so-called welt (or inner sole), made of gummed material, is laid on the sole of the last, and made fast to the tricot lining with adhesive stuff. Then a strip of material, about 1¼ inches in breadth, gummed on both sides, is laid round the border of the sole, which is intended to give the shoes a firmer hold. The so-called "after leather" (inside heel piece) comes next, made of cotton material gummed on both sides, and serves to strengthen the hinder parts of the shoe. Then comes the middle sole, which is also a piece of doubly-gummed cotton stuff, and, finally, the upper piece (outside) of the shoe. The shoes are now finished with exception of the real sole; this, which consists of pure india-rubber (so does the upper piece) is fastened to the middle sole and the upper piece with adhesive stuff *after* the shoes have been sewed. The stitching is done by hand *with the help* of a kind of marking wheel (*Dessin raedchen*) *with the fine points on which*

the borders of the upper piece and of the sole are marked with a sort of quilting seam which, besides joining the pieces, is ornamental. The ordinary and most marketable shoes are those made in the manner described above. The only tool used by the workwomen is a kind of roller for compressing the parts together.

To learn all the above manipulations perfectly a woman requires generally three months practice. The work is troublesome, and is rendered more difficult by the stickiness of the material used, parts carelessly allowed to come into contact adhere at once, and are spoiled, as they cannot be separated again. It requires peculiar care to apply the upper part at the first attempt exactly in the right position, as once applied it is not to be removed. The labour cannot be called severe; it has to be done partly sitting, partly standing, and the 140 women employed at Wimpassing, whose ages range from 20 to 35 years, earn an average of 5 florins a week, that is, from 3 florins to 7 florins. They work in a roomy, light, and well ventilated apartment, and their employment has no sort of injurious influence on their health.

2. *Making Balls.*—The india-rubber prepared in thin sheets is cut by the help of metal forms into angular pieces, of which four go to make one ball. A number of these and a few drops of water are enclosed in each ball before it is finally closed up. The number used shows the worker who is responsible for faulty balls. The balls when they are first joined are of an oblong shape, but the process of vulcanising expands the water into steam, which, pressing with equal force on all parts of the interior of the ball when it is in the round iron mould in which it is vulcanised, gives it a globular form. The girls are not employed in the process of vulcanising. They, however, have to paint over the finished balls with chalk to keep them from sticking to each other. The ballmakers at Wimpassing, at present 80 in number, are seldom more than 20 years old, and earn between 3 and 5 florins weekly. They do most of their work sitting, and it neither injures the health nor taxes the strength in the least. They can acquire the requisite dexterity in from 8 to 14 days. They work in a shed, lighted from the roof, 24 fathoms in length, of equal breadth, and 18 feet in height; tubes, technical and chemical apparatus, and other india-rubber goods are made in the same building.

3. *Manufacture of Cloaks.*—Women of 25 to 40 years of age are employed in making up these with the double-chain stitch sewing machine; a sedentary employment, very trying for chest and arms. They earn 6 to 9 florins a week, must be intelligent, and can become skilled workers within 8 weeks. Women of 20 to 30 years of age are employed to gum strips of stuff with india-rubber over all the seams. They work standing; their work is not hard, but the ethereal oils give out a vapour, which, however, is not deleterious. They must be very clean and neat, as the goods they have to work upon come to them quite finished, and pass direct from their hands into trade. They have to learn to spread the solution of india-rubber smoothly and equally, faults in this respect marring the cloaks, &c, They earn from 6 to 8 florins a week, working in a spacious, light, and well-ventilated apartment.

4. *Manufacture of India-rubber Figures.*—After the age of 25 years the women do not retain the necessary suppleness of dexterity in the fingers for this work. The workers are therefore chosen below this age. It occupies several months to learn the cutting out and composition of the figures. In other respects their work is identical with that of ballmaking. A skilled figuremaker can earn 6 to 8 florins or more per week.

5. *Manufacture of India-rubber Tubing.*—The Wimpassing factory has a peculiar machine for this manufacture, which is attended to by girls between 14 and 20 years of age, who earn from 3 to 5 florins. The work is done standing and principally employs the hands. The tubes have to be rolled up in stuffs to bring their texture on the outside of the tubes, and thus enveloped the tubes are vulcanised. The process of vulcanising is not attended to by the girls. This work is in no way injurious to health, and is learned in 8 to 14 days.

6. *Manufacture of Technical and Surgical Articles.*—Women from 14 to 40 years of age are employed, some to cut out, others to put together or to finish, and the rest to wash, clean, and polish the finished goods. This work is not trying, nor in any way detrimental to health. It requires industry, and feminine dexterity with scissors and needle, &c. The wages vary from three to seven florins.

7. *Manufacture of Combs.*—Women are employed (1) stamping, (2) shaping, (3) polishing, (4) finishing, the combs. Prepared plates of hardened caoutchouc are supplied to the workers, who, with a perforating machine, stamp them through in such a manner that each plate becomes two combs with the teeth fitting dovetailed together. The plates thus stamped are easily drawn asunder. The workers, 30 in number, are from 18 to 26 years old. They do their work standing, and earn from 6 to 9 florins a week. The work can be learned in 8 to 14 days and is not fatiguing, but the workers are to some degree affected by the temperature, 30° to 35° centigrade, of their workshop, raised by the necessity of heating the stamping machine to 45° to 50° centigrade. Most of the women, especially the elder, become habituated to this warmth, but its effects are prejudicial to health, although not causing any apparent illness. From the stamping (or perforating) machine the combs are passed to several machines attended by women, for shaping them, according to their quality. Such are:—sharpening machines to point the teeth; steel cutters with which the teeth are equally rounded from their points to their roots, and others with which the bases of the teeth are smoothened; grinding stones to round off the backs of the combs; and finally round brushes which brush out the interstices of the teeth. These processes are conducted by 45 girls, aged from 14 to 18 years, who earn from 3 to 5 florins a week, and learn their work in the course of from 8 to 14 days. The workshop is kept at a normal temperature, but the grinding, cutting, turning, and brushing processes are attended with the production of a great deal of india-rubber dust. The evil effects of inhaling this are obviated in the Wimpassing factory by the use of respirators, and it is a fact that those of the workers who have consented to use the respirators have suffered none of those maladies of the respiratory organs which they were previously exposed to from the continual effect of the dust. After all the above-mentioned processes the combs are polished by being pressed by hand, with a solution of polish, against revolving discs of mouse skin (or fustian, "Barchent") until they are as bright as they need be all over. Comb polishing at Wimpassing employs about 50 men and the same number of women, of the ages of 20 to 40 years, who earn from 3 to 5 florins a week. The work is done standing, entails considerable labour of the arms and fingers, and requires two or three weeks to learn. But notwithstanding this, all polishing might well be entrusted to female labour. Arranging the combs, *i.e.* sorting and dusting them, counting, packing up, and numbering them, is done in a large room by 14 to 16 women of some intelligence, as they have to do with nearly 400 different *numbers* on the combs, which they must be able to assort with precision. Their ages vary from 18 to 35, and they earn from 5 to 7 florins a week.

It is seen from the above report that the majority of the workers in this branch of industry are not called upon for any unusual strength of body or intelligence or education. It is the more satisfactory to record that the intellectual standard of the present population of the neighbourhood of Wimpassing is very satisfactory, and its morality all that could be desired. The workers live mostly a distance of three to six miles from the factory, often still further, but in greater comfort. About three-fourths of their number have a warm dinner and dress respectably. As to the condition of health, the report of the said factory shows most decidedly that it is only prejudice that attributes to India-rubber manufacture any consequences prejudicial to health of the workers. Long experience and precise statistical data show that beyond the unfavourable effect of the heat that prevails in the comb perforating room, and the dust in the shaping processes, no kind of detriment to the health of the workers in the factory, male or female, attends their employment. As to the heat in the perforating room, its effects are obviated

by allowing the workers to change after every few weeks from this work to another for the same period. The fine caoutchouc dust, however, which is very injurious to the lungs, is best obviated by respirators. Nevertheless many of the workers refuse to use them as troublesome, uncomfortable, &c., and the most urgent representations are often unsuccessful in convincing them of the utility and necessity of the respirators; but when they find (commonly in two or three months) that the dust they formerly considered innocuous can, by continued inhalation, become dangerous, they leave their work. From this circumstance it arises that the "personelle" of the comb factory is subject to a continual change, partly intentional and partly unintentional. The india-rubber factory at Wimpassing employs nearly 500 girls and women. Of these 36 °/₀ are from 14 to 20, 45 °/₀ from 20 to 30, and 19 °/₀ from 30 to 50 years of age. 28 °/₀ are employed in the shoe manufacture, 16 °/₀ make balls, 14 °/₀ india-rubber figures, 2 °/₀ tubes, 6 °/° surgical implements, &c., and 28 °/₀ combs. Further, 21 °/₀ earn from three to four florins a week, 43 °/₀ from four to five florins, and 24 °/₀ from 5 to 6 florins, 12 °/₀ more than 6 florins.

Metal Industry.

Manufacture of Gold and Silver Articles and Jewellery (Vienna).

The work entrusted to women comprising: 1. *Gilding.* This is done principally by women, and by the process described under the heading of bronze goods. The objects gilt are very numerous, including the whole of the silversmiths' manufacture. The apprenticeship lasts, at present, six weeks. Wages 4½ to 8 florins, average 5½ florins a week. 2. *Polishing.* Process as with bronze goods. Wages 6 to 7 florins. 3. *Grinding.* The object of this process is to give a polish to the parts of the precious metal that are left in their natural condition; it is finer or simpler according to the object of manufacture. Pumice stone pulverised and moistened with water or oil is strewed on the surface, which is then rubbed with wood or a file covered with felt. This manipulation is repeated with tripoli (rotten stone), and after that with jeweller's red, for which the felt-covered file is used again, or a good chamois leather. But the finest polish is produced by friction with the naked hand. Average weekly wages 6 to 7 florins. 4. *Enamelling.* The objects to be enamelled are first engraved, the cavities, i.e., are prepared for receiving the enamel. These cavities are then filled with enamel in a moist state, and the moisture removed with a dry cloth. The object is then put in the enamel furnace for a first smelting, and this is repeated. The design is then filed down smooth with the emery stick, after which it is washed and dried, and then burned bright in the furnace. This work requires years of experience before it can be satisfactorily done. Wages 5 to 12 florins a week, average 7 florins.

5. *Other Employments.*—In addition to the departments of gold and silversmiths' manufacture above mentioned women are employed in many other subsidiary labours, for example, in the manufacture of *chains* of links of thin wire bound together in most cases, every link being separately made and soldered. Women are also employed in making patterns that, in consequence of great competition, have become too cheap for the employment of men in their production. Finally the system of division of labour furnishes occasion for the employment of women in many branches of the manufacture formerly only entrusted to men; amongst these is the making of hinges or similar opening and shutting pieces for which precise and exact workmanship is the principal requirement.

With the extension now in progress of the Austrian *bijouterie* manufacture scarcity of labour may be expected, which will afford increased opportunity for the employment of women in this wide and remunerative field. The processes numbered 1 to 5, excepting gilding, are performed standing. The only fatiguing process is polishing, so that the more robust women only are employed at it. The ages of the workers vary from 16 to 40 years, the majority of them are Viennese.

For silver manufacture, *i.e.*, of larger objects, women are only, with rare exceptions, employed for polishing, which follows the process of blanching, and is done with a burnisher moistened in soapwater or similar preparation.

For gold manufacture 70 per cent. of the women employed are engaged in grinding or polishing. After these manipulations the objects pass in one case to colouring (in corrosive colouring material, a mixture of saltpetre, salt, and muriatic acid, mixed and boiled, in which the objects are suspended as required); or in the other case (when ground bright) to finishing in their natural colour.

For jewel work, women are employed exclusively in burnishing and polishing. The number of women employed in gold and silversmiths' work and the manufacture of jewellery in Vienna is about 200.

MANUFACTURE OF GOLD, SILVER, AND GARNET WARE, AT PRAGUE.

1. *Manufacture of Gold and Silver Wares.*—Women are only employed for grinding. Their apprenticeship to this work lasts three years; they commence at the age of 12 or 13, and begin by polishing small objects, such as balls, pencils, earrings, &c., and when they have acquired a certain degree of dexterity they are entrusted with rings, crosses, brooches, bracelets, and the like. They are promoted by gradation according to their ability and seniority in apprenticeship. The following is their work:—The article already finished by the working goldsmith, but quite dull and uninviting in appearance, is first smoothed by hand with a fine rubber of the shape of a crayon with a flat extremity, and then brushed with tripoli (rotten stone) with a hair brush. The corners or cavities into which the brush cannot be introduced are rubbed with splittings of boxwood or with hemp stalk or prickwood (*Euonymus Europœa*), and then with soft lambskin or twine. Finally the article is polished with jewellers' red with a cloth, or leather file, and gets its first polish by this. Larger surfaces, such as the inside or outside of bracelets or signet rings are further rubbed, to make them quite smooth and brilliant, with jewellers red on the naked finger, which removes the streaks that remain after the rubbing with the cloth. The parts that cannot be reached with the finger are treated in the same manner with smaller or larger fragments of cork. It remains to rinse out the article and get rid of the remnants of the red. Gold articles intended for 'colouring' are only polished with the rubber, and then with tripoli, but not brushed with jewellers' red; they are then chemically coloured to the required shade of yellowness.

The work is done seated in front of a work bench of a semicircular hollow in shape, in the middle of which is the so-called "filing nail," on which the object is placed to be polished, and which supports the hand. The girls sit on a very low three-legged stool, free, and not leaning on the chest. The work is easy and fatigues only the hands, it is continued 10 hours a day throughout the year, with the exception of Sundays and holidays. The women are all engaged on weekly wages, and earn, according to their ability, from 5 to 8 florins a week. They work overtime on occasions of pressure, and one hour in that case is reckoned equal to 2½ of ordinary working time. In the factory of Michael Goldsmith & Sons at Prague, the apprentices receive at their entry 70 kreutzers a week; and their wages are increased, so that for the three years of their apprenticeship they get 3 florins a week. The work rooms are throughout light and roomy and well ventilated. This factory employs altogether 45 girls and women, of ages from 12 to 45, including 15 apprentices.

2. *Manufacture of Garnet Ware.*—The only employment of girls, in this industry also, is for polishing, which is, however, a different process to that above described. The separate parts of the articles are polished before their combination on a grinding lathe, turned by the foot of the worker, who holds the object to be polished in her hand. The first polish is done with tripoli (rotten stone) on a coarse felt on the lathe, which smooths the object; the next, also on the lathe, is done with red mixed in oil, which is brushed off with a fine brush; the third and last with red mixed in spirit, which is again brushed away, and the object has then its proper degree of polish. The parts are then put together by the goldsmith, and the whole article is then given

to a woman, who smears it with a mixture of soot and spirit, brushes this off again and then brushes it over with red, which makes it perfectly clean and brilliant. The settings are treated in the same manner, but they are polished with twine and not on the lathe, because the twine penetrates all the joints.

The apprenticeship to this employment lasts three years, and the apprentices are paid during the first year 5 florins a month, and an increment every half year, such that at the end of the third year, they are drawing 10 florins monthly. The skilled workwomen in the factory under consideration earn, according to their skill, from 24 to 30 florins a month, and are paid every 14 days. They work 10 hours a day, and are paid a higher scale of wages for extra time.

MANUFACTURE OF MINT-MARKED SILVER GOODS, CALLED CEMENT-WARE (KITTWAAREN).

This is principally done by female labour, for the women do every part of the work excepting rolling the metal, stamping the design, and soldering with fire.

1. *Cutting out the plate metal* is done with shears, generally by apprentices learning this hard work. Wages 3 florins a week.

2. *Cutting out the pattern* with shears requires more dexterity and is learned in a month or two. Skilled workers earn from 5 to 6 florins a week.

3. *Scouring the stamps* with brush and sand is not very difficult, although monotonous. Weekly wages 6 to 7 florins.

4. "*Changing*," *binding and inserting with hard solder*. These are the hardest manipulations, generally done by one and the same girl, who requires five to six months to learn them. The "changing the balls" is bending round the edges of a pair of plates, intended to fit exactly together, with an iron tool. Binding, that the soldering of two plates may be done, ties them together in several places with wire. Inserting the hard solder on the parts to be fastened is done with tongs. The work is not hard, girls of 15 are able to undertake it, dexterity and attentiveness are the chief requirements. Weekly wages 7 to 10 florins.

5. "*Adjusting the dints*." Impressed places on the plate are raised with a proper tool and thus made level. This task requires great attentiveness and care. Wages 7 to 10 florins weekly.

6. *Cementing*.—*Filling* in a substance to bind tightly together the parts of an object, *e.g.*, the handle and blade of a knife. This work, in which nothing but handiness is required, is learned in a month or two. Wages 8 to 10 florins.

7. *Polishing*.—For this work, done with steel, none but skilled polishers can be employed, as others may utterly spoil the article. A longer term of apprenticeship is therefore required. Wages from 8 to 10 florins.

In the manufactory of A. B. Bacher, Vienna, the only establishment in this branch in Austria-Hungary, the working hours are 10 daily. The factory, still extending, at present employs 70 girls; there are such factories in Germany which employ 300 to 200 women.

MANUFACTURE of ELECTRO-PLATED GOODS.

Scraping, filing, polishing by hand and machine, electro-silvering and gilding are women's work, but chiefly polishing the silvered or gilt ware. Women are further employed in operations of less importance, as rolling, pressing, cutting out small metallic objects, soldering, dipping, cleansing, &c. The object of scraping is to remove the "burr" (projecting edge) on different objects, created by stamping between two moulds; it is done by holding the article against the revolving blade. The blades used for this are coarse, to remove the burr quickly, and the surface scraped by them is filed down by hand with fine files, and the article is then ready for grinding. Grinding by machinery involves three distinct operations. (*a.*) Grinding proper on a revolving "glazer" moistened with oil. (*b.*) Brushing on a revolving circular brush also oiled, which gives the ware a not very brilliant but uniform surface and quite smooth. This is enough for ware to be silvered; that which is to be brought into trade unsilvered has further to undergo—(*c.*) Polishing on a revolving cloth-covered disc, with oil and chalk. Hand polishing is done

with pumice, and with charcoal on hollow articles, only on such parts as the polishing disc does not touch.

In the process of electro-silvering the workers are almost exclusively women. The ware, mechanically freed from dirt and grease, is plunged in a vessel filled with potash lye kept boiling, to remove all grease, then hung upon copper wire and "pickled," *i.e.*, plunged into a mixture of acid and afterwards rinsed out in pure and in ammoniacal water, then scoured with fine sand, rinsed finally with distilled water and hung upon copper wires in the silver bath in which the galvanic battery works. The preparation of the baths, the application of the acid, and the weighing before and after the silvering process are the only works done by men. When each piece has received the required coating of fine silver it is *rasped* to get rid of the dull chalk coloured appearance that it gets in the bath. This is done with a revolving circular brush of fine brass wire, and, in the parts not reached by the brush, with small wire brushes by hand. After the rasping the ware is washed in pure water and dried, and is then ready to be polished.

Many articles are gilt inside. After these have been silvered externally, or generally on all parts intended to remain white they are covered with lac and suspended in the gold bath in the same manner as in the silver bath. When they are gilt the lac is removed, the object rasped and dried and polished, &c. The operation of polishing has two parts:—(*a.*) "Grounding," by which the silver precipitate is compressed with a proper tool called the "steel." (*b.*) "Shining" or perfectly smoothing the surface with a blood stone on a handle, by which a brilliant polish is obtained. Soap water is used in polishing.

Several months are generally required by the workers to learn the above manipulations. They are mostly done sitting and do not overtax any physical organ, and with precaution, especially in polishing unsilvered objects with chalk, are not injurious to health. The ages of the workers range from 16 to 40, their daily labours are for 10 hours, their weekly earnings average 5 florins, while very skilled workers earn as much as 8 florins a week or more. The number of women engaged in the electro-plating works of Lower Austria is 500 or 600.

Manufacture of Imitated Leaf Gold and Leaf Silver.

Metal beating.—In this trade women are employed in filling and emptying the forms, i.e., parcels of 700 gold beaters' skins in a pile between which the metal is beaten. This work is and always was especially woman's work, as it requires indispensably a delicate and supple hand, and could never be performed by the men employed in this trade, who from constantly hammering with heavy hammers of 10 to 18 pounds weight have lost the necessary suppleness of hand. The other tasks, *e.g.*, beating and pressing the forms, which require physical strength, are unfitted for women.

Filling the Forms.—The workwomen using very thin wooden tongs lay leaves of metal of a square inch in size, precisely in the centre of the gold beaters' skin with the right hand, and with the left hand push the upper skin over it.

Emptying the Forms is taking out, with the same tongs the metal leaves now beaten to an area of five square inches. These leaves are then either laid in paper books kept ready for the purpose, or laid out and counted in parcels of 110 metal leaves to a folio sheet of paper. The last is the so-called leaf metal or gilding metal. This work requiring considerable mechanical dexterity, it is generally necessary that the workers be trained to it from an early age. The time of apprenticeship used to be three years for girls of 12 to 16 years, during which time they were maintained and paid 3 to 4 florins monthly. Since the introduction of piece work the term of apprenticeship has been reduced to one year. A woman of average dexterity can empty and fill 4,000 leaves in a day, and skilled workers can do 7,000 to 8,000 leaves. No unusual degree of strength or education is required. The work is done seated, fatigues no part of the body in particular and is in no way prejudicial to health. The ages of the workers vary from 15 to 50 years, few exceed this age, as they then lose the elasticity of the hands and rapidity of movement

required. Three-fourths of the workers are country girls from Lower Austria and Bohemia, who came to the business at the age of 12 to 16 years; only one-fourth of them are Viennese, who do not like the condition of long apprenticeship. The weekly wages for 10 hours daily work are 6 florins, piecework calculated by the number of forms filled and emptied produces about 7 to 8 florins. About 50 girls and women are employed in this industry in Vienna.

During the last two years girls have been employed with good result, in the factory of C. Falk and Co., of this place, in fine gold beating, for cutting the genuine leaf gold, silver, and aluminium. This occupation of women has been long common in Germany, France, and England, but in Austria it failed principally from the opposition of the men employed, but partly from the trouble of the apprenticeship. This is the more to be regretted because it is only by the use of the far cheaper labour of women that foreign competition can be successfully withstood. Most of the processes resemble those described already, the cutting of the gold is an easy and agreeable task. Skilled workers earn 5 florins which with energy they may increase to 10 florins a week.

File Manufacture.

Women are employed:—1, *To clean* the files after they are tempered. This is learned in a week. To clean the "cut" quickly and thoroughly is only learned by long practice. No exertion of strength is required except for the very large sorts of files, and then only momentarily, the only requisite is good eyesight—finding out at once the parts that require cleaning. The work is done standing. The brushing along and across tires the hands, but the work done in healthy airy localities is in no manner detrimental to health. In large factories this work is generally committed to widows aged 30 to 50, who have their pension and free lodging and earn 3 to 3½ florins weekly in addition.

2. *To pack* the files in paper is woman's work requiring much practice and precision. Wages 3 to 5 florins. About 100 to 150 women are engaged in this industry in Lower Austria.

Manufacture of Screws and Rivets.

For the former women from 14 to 40 years of age attend to the self-acting machinery, and earn 3 to 6 florins a week. Men do this in rivet manufacture. Women *sort* the finished goods of both kinds, and *pack* them; weekly wages 4 florins; wages 3 to 5 florins. No previous knowledge is required for these industries, except that the packers must read and write. The workers are generally members of the families of the men employed in the same factories. They work 10 hours a day, and number in Lower Austria about 70 or 80.

Nail Making.

In the manufacture of nails by machinery women are employed:—

1. *In cutting the nails.*—This is done by machines. The woman has to stretch a strip of iron plate in a fork made for the purpose, and with a regular turning action bring it under the apparatus that cuts it. This operation is repeated about 60,000 times a day, or with 10 hours work 100 times per minute. It requires strength in the arms, and only strong girls over 16 years old are employed upon it. Their term of apprenticeship is four to six weeks, their weekly pay 5 florins.

2. *In pressing the heads.*—Generally the nail is cut and the head stamped in one operation, but some sorts of nails after cutting are submitted to a second independent operation called "pressing the head." Every nail is inserted into a contrivance for splitting or stamping a head upon it, which the machine completes by itself, but much more slowly than the first process only at the rate of 15,000 nails in a day. It is attended by boys and girls. Their work is not fatiguing and is learned in a few days. Weekly wages 3 to 4 florins.

3. *Packing-up* is done exclusively by women not less than 14 years of age; it includes the preparation of the papers, the weighing out and filling in of

the nails, and finally the tying up of the packets. All these operations are earned in succession by the workers, so that each can do them all. A skilled worker makes 100 to 200 packets a day, and thus without fatigue earns 3 to 5 florins a week. The workers must have some education, as they have to weigh out samples of various sorts, count them and record the result, and keep notes of the number of each sort packed. There are 40 or 50 women employed in the nail manufacture of Lower Austria.

Manufacture of wire tacks is carried on by self-acting machinery, and women are only employed in packing, counting, and weighing, by which they earn from 3 to 5 florins a week.

Manufacture of cast-iron and metal goods has not many occupations suitable for women. They are, however, employed:—1. *To sort the Metals.* In purchases of metal refuse, the metals are received mixed and unassorted, in which condition they cannot be used, they therefore require to be sorted (copper with copper, brass with brass, and so on), the pure metals are also to be separated from the other, and from adhering fragments of iron or foreign metal by breaking or cutting before they come to the founding. Shavings and filings have to be assorted also by sieves, magnets, and water. This work is done by elder persons who must be strong, and learn their business by gradual promotion. They earn 4 to 5 florins a week.

2. *Weighing the metals and compounding alloys.*—In foundries in which the casting is done in crucibles and one "charge" (batch or "casting,") does not weigh more than 50 lbs., women, under supervision of men, do this work. Wages 4 to 5 florins a week.

3. *Cleaning the casts* from sand with iron brooms and brushes and then sorting and arranging them. Weekly wages 4 to 5 florins.

4. *Grinding and polishing.*—The rubbing is done under superintendence of a man, in large establishments of several men, who have to cover with leather the "wheel mill," which is of wood, 8 to 10 inches in diameter and half an inch to an inch in thickness. The wheel mills being so covered are set up by men on iron spindles running in sockets, and the further process of grinding is done by girls. Polishing is done in the same manner with the use of leathers with chalk and stearine oil, or cloths with the same mixture. The "wheel mill" is driven by steam. These operations are done seated, by women of ages between 18 and 50, whose apprenticeship lasts two months. Their earnings are 6 to 7 florins, or with especial skill more. *Hand rubbing.* The object laid on the so-called grinding trough is rubbed with pumice stone, charcoal, and water, until it has a certain degree of polish. This manipulation is also under the supervision of men, and girls of 16 and upwards are employed. It is done sitting or standing. Wages 5 to 7 florins a week.

5. *Bronzing and lacquering objects of cast-iron and zinc.*—The articles being finished the colours are laid on with a brush in one or more coatings and dried in an oven. The work is done sitting or standing by girls of 16 and upwards; their weekly wages are 5 to 6 florins, and if they are particularly skilful they can earn as much as 10 to 12 florins.

6. *Packing and labelling* the finished goods. The articles are finally cleaned up in the warehouse and then packed according to sorts and numbers in paper. The parcels are then labelled descriptively of their contents and are ready for dispatch. Girls of 16 to 24 possessing the necessary school education are employed for these processes, and are paid 5 to 6 florins a week. The daily hours of work in the foundries are 10, exclusive of pauses for rest.

Manufacture of Steel Pens.

There is only one factory at Vienna, and women are there employed about—*a.* The hand presses; *b.* The grinding wheels; *c.* The sorting of the pens. It does not appear from the nature of the manufacture that the field for female employment can be increased in this branch.

1. With the *hand presses* the pens are punched from the strips of steel plate, bored, stamped, split, &c. Each process has its peculiar press in which the pen is introduced with one hand, while the press is worked with the other.

2. The *grinding* is done by pressing the pen against the revolving grinding wheel.

3. The *sorting* of the pens involves trying each pen on the thumb nail.

Girls are also employed to paint and varnish the pen holders.

All this work, which is not fatiguing, is done seated. The presses fatigue the right arm mostly and the sorting of the pens taxes the eyesight. Workwomen skilled in steel pen making are not to be found in Vienna, they have all to be trained. With average intelligence they require two to three months to learn the simpler processes, and three to six months for the splitting and sorting. If they are commonly handy and intelligent no especial education is required. Their age is from 16 to 30. Half of them come from Bohemia and Moravia and half from Lower Austria, particularly Vienna. The latter live with their parents. Their weekly earnings amount for some months to 3 or 4 florins but afterwards to 5 or 7 florins, according to skill.

Manufacture of Needles, Pins, &c.

A. *Manufacture of Sewing Needles.*—Women are employed:—

1. *To puncture the eyes.*—This work, not fatiguing, is done sitting, with a proper machine. The needles are, in the first place, made double, *i.e.* the lengths are cut at twice the length of one needle, sharpened at both ends, and the heads of two needles (each a groove and an eye) made simultaneously in the middle. A steel die is in the machine, in which the centre of the length exactly fits, in this die there are holes at the places where the two eyes are to come, and steel wires pass through these when the treadle is pressed with the foot. The worker easily feels whether the length lies right in the die, and does her work rapidly, taking up and spreading a hand full of lengths and laying one after the other in the die, and, when this is accurately inserted, pressing the treadle. Women from 18 to 40 years of age are employed at this work. It requires no previous knowledge, the apprenticeship lasts about six or eight weeks, and the weekly wages are 3·50 to 4·50 florins or an average of four florins.

2. *To thread the needles.*—The bored lengths are threaded in parcels of 100 or 200 on two wires, in order to be freed with a file or a grinding stone from the burr (projecting edge) made in stamping. This threading is done by women and children, generally without any machinery, at their houses, and is by no means hard work. Ages 12 to 30, weekly earnings 2½ to 4½ florins, average 3½ florins.

3. *Haymaking (Beheulegen)*, that is, sorting the polished needles with their points all in one direction. The worker, seated before a table, has the needles before her inclosed by a board, and smooths them parallel in a heap towards her, sorting them as she does so into two heaps with the points to and from her respectively. The work engages rather the sense of feeling than of sight, as the needles are thicker at one end. It is very easy and is done by little girls of 13 or 14 years old, and by women of 40 to 50. They earn 2½ to 3½ or an average of three florins a week.

4. *Sorting* according to length. The distinctions of number are by very slight differences in length. This sorting therefore requires experience. The worker sits at a table and lays the needles in a small enclosure between two pencilled lines, the breadth of which is less than the length of the needles, which accordingly project at both ends. She has two little pieces of wood, with which she smooths in one direction at both ends continually so that the longer needles are all gradually brought to one end where she picks them up with the palm of the hand. The short needles remain in the inclosure and the worker separates them all into a number of heaps, slightly differing in length. This work is not fatiguing, and requires no special knowledge, but long practice; ages 14 to 30, wages three to five, average four florins.

5. *Searching* (*a*) for faulty needles, i.e. such as are bent or broken; (*b*) assorting the perfectly faultless needles as *prima* or *secunda* qualities, and leaving the others for *tertia*. The worker, seated, has the needles on a board at her left hand, and rolls them, with the little finger of the right hand, one by one across the board to her right. It appears in the rolling whether or no the needle is perfectly straight, but she examines at the same time whether eyes and points and the whole are accurate and properly polished. This work taxes the eyesight the most, and requires a degree of practice and experience. Ages 18 to 55, wages 4 to 5 or average 4½ florins weekly.

6. *Packing* the needles in papers generally of 25. The worker has first to fold the paper, with the help of a leaf of metal, then with a small machine she counts out the needles into the paper. This is done by stroking a handfull of needles to-and-fro against the machine, which takes up 25 in that number of indentations, then by lifting a small frame the 25 needles are transferred out of the receptacles into the paper. The papers have ultimately to be closed. The work is not hard; ages 14 to 45; wages 4 to 5½, average 4¾ florins a week.

7. *Further packing.*—Cutting labels, gumming them on the needle papers, and making these last up in parcels. Like all the other this work also is done seated. Ages and earnings as in No. 6.

B. *Manufacture of knitting needles* is nearly all done by men; women are employed in examining the needles and in the processes of packing and labelling, earning as above.

C. *Hair pins.*—Women are employed:—

1. *In lacquering.* The worker fills a vessel with hair pins, and puts in the prepared black japan, and then stirs the whole with a fork. She then pours out the hair pins on to a wire grating, and so carries them to dry in a heated oven. The work is not fatiguing, but the smell of the japan and the heat of the oven are rather unpleasant; women of healthy constitution are therefore selected for this work.

2. *In bunching* the hair pins, *i.e.* tying three together with wire. This easy work is generally done by the women in their houses; wages 2 to 3 florins.

3. *Packing.* Wages for lacquering and packing 4 to 5 florins or average 4½ florins.

D. *Pin manufacture.*—Women are employed:—

1. *To head the pins.* The worker is seated in front of the "heading-board" which consists chiefly of a beam, weighted with a metal ball, travelling up and down between vertical guiders, having at the lower end a small steel stamp (die) which falls on the matrice (die) fastened to the table. Each part of the die has a semi-globular indent, and the lower half a groove. The worker has by her side the pointed "lengths" and the prepared heads of screw-shaped spun fine wire, she picks up a head on the point of a "length" and pushes it up to the thick end of the "length." The beam with the upper stamp is raised by a movement of a treadle and the pin laid on the lower stamp accurately, the point being still held by the fingers. Then six or eight blows are given with the die, at each of which she gives the pin a turn, so the head, &c., are formed. The work is not particularly fatiguing with ordinary sorts of pins. Besides boys of greater age and girls, children (generally boys) of 12 or 14 are employed, but only for some hours after their attendance at school. Girls of 14 earn 3 to 4½ florins, the school children 1½ to 2½, average of all 3 florins a week.

2. *To stick the pins on to paper.* The worker is seated with the pins at her side, which she takes up with a comb and sticks into a machine-folded and fastened paper. The machine contains grooves at the places where pins are to go so that she cannot fail to keep the distances regular, and the work requires very little learning. It is generally done by the girls in their houses. Ages 14 to 30; earnings 3 to 5 florins, average 4 florins.

There are many other parts of the manufacture of this class of goods, now done by men, which might be transferred to women; as drilling the needles *i.e.* finishing the eyes, and gilding the eyes, an easy work requiring neither experience nor exertion of strength; or "blueing" knitting needles &c. in an oven, or marking them with the spiral white line that is made on them with a small machine very easy to manage; or spinning the pin heads, which is done with a small spinning wheel, &c.; and wherever machinery is used to replace the heading board, for heading pins, this might be attended to by girls under the supervision of a manager.

This branch of industry, requiring rather precision and care than exertion of physical strength, employs a majority of delicately constituted women; many unfitted by ill health for other branches of industry. This, in part, explains the smallness of their earnings. The work lasts 10 hours a day. The school children however work only four or five hours.

Manufacture of Plated Goods.

In this manufacture women are exclusively employed only for polishing; a work that can be learned in a few weeks; is done seated; and taxes especially eyesight and chest, the first with the shimmer of the silver, the last with stooping at the work. The workers are of all ages from 14 upwards, including married women, they earn according to their industry 2 to 8 florins, average 4 or 5 florins a week, at 10 hours work.

Manufacture of Plates and Wire of Copper, Brass, Tombac (Red Metal) and Pakfong (German Silver).

Women are rarely employed; when they are so it is :—

1. *Moulding.* The metal plates, for rolling, are cast in sand. They are about $\frac{1}{2}$ inch thick, 6, 12, up to 15 inches broad and 15, 20, up to 24 inches long. The task of the moulder is the preparation of the moulds for the casting and the covers to them. She uses an iron frame two inches in height, in the middle of which, on a stone slab, the model to be struck off is laid. Over this she sprinkles with a sieve properly prepared plastic sand, kneads it, stamps and rolls it with an iron roller, until the sand fills the frame with a firm, uniform substance. The cover is made in the same way, without any model. Physical strength is required for this work which involves handling a roller weighing 80 to 100 lbs,; and the forms, which weigh 70 lbs., have to be lifted up. No previous knowledge is required, but attention and dexterity only, and the work can be learned, with a good will, in a few weeks. Only adults are employed; their wages are 4 to 5 florins.

2. "*Pickling.*"—The metal plates oxydise by repeated exposure to heat, and the oil spread on them at every rolling covers them with a black surface. To get rid of this, after they are sufficiently rolled, and softened by heat, they are "dipped" in diluted sulphuric acid, which removes the surface. After half an hour dipping they are cleansed in running water and scoured bright with fine ash and brushes. This work requires no previous knowledge. Only adults are employed, whose wages are 4 to 5 florins a week.

3. *Drawing wire.*—The wire, of brass and copper, quite thin, intended for web, has to be first wound and unwound from reels. This is done by young girls of 13 to 16 years of age, who earn weekly 3 or 4 florins. They are drawn from the neighbourhood of the factory, and work 11 hours a day; the younger ones nearly all live with their parents, the older, independent workers lodge free in the factory buildings. The work is done in light, airy rooms, and is not in itself prejudicial to health, most of the factories are in the good fresh mountain air, and the sanitary condition of the workers is from all these causes excellent.

Manufacture of Pakfong goods (German silver).—The Imperial Royal privileged manufactory of metal ware at Berndorf is eminent in this branch of industry. It produces ordinary pakfong ware, alpaca ware, and alpaca silver ware. In the last-named industry only women are employed in rolling, stamping, and cutting out small metal articles, fileing, grinding, silvering, gilding, and polishing. The processes are those technically described under the rubric electro plate q.v. Remuneration is generally calculated by quantity. At the easier tasks earnings range from 4 to 8 florins. Those which require some time to learn afford beginners $2\frac{1}{2}$ to 3 florins, more advanced workers earn 4 to 6 florins and for great industry and skill, even 8 to 10 florins. The whole number of women and girls employed, in Lower Austria, in this branch is from 600 to 1,000. The number is less in summer, on the plains, where many of the workers turn their industry in that season to their fields and gardens.

Manufacture of Lamps.

Women are employed :—

1. *In cutting and stamping the metal, i.e.,* in cutting cut strips of metal or iron plates into rounded bottoms, perforating these, engraving designs, folding and bending the parts for the burners of the lamps, &c. The work is done with machinery set in motion partly by steam and partly by hand, the worker holds

the plate under the stamp and works the lever. This requires great bodily strength, but cannot, generally, be called severe work. It is learned in 14 days, the women are from 16 to 25 years of age. They are paid for the apprenticeship by the week (3½ to 4 florins); afterwards by hundred or thousand pieces, earning 4 to 7 florins a week, according to their skill and rapidity of work.

2. *Annealing the metals.*—Metallic parts worked on the stamps have to be heated before each stamping, for which they are laid in iron pans and put in the scaling furnace for half an hour or an hour according to the thickness of the metal. This is done by women of a strong constitution, who have to bear the heat of the furnace all the day long. These women are never under 20 years of age and earn 4 to 5 florins a week.

3. *'Pickling' the metals.*—When they cool from the furnace they are covered with a coat of black scales, which would damage the stamps and create much dust. The metals are therefore 'dipped' before every stamping. They are put in a willow basket and, with the basket, in a vat containing a mixture of water and vitriol, in which they are agitated. Then the basket is drawn out and carried to the brook and fresh water pumped on it until the metal is cleansed, when it is taken to the furnace and dried. This work also is given to strong women above 20 years of age, whose wages are 4 to 5 florins a week.

4. *Making burners, i.e.,* girls fold the parts of the burners together with the help of machines, set them straight and roughly finish them. This work is easy, and done seated by girls from 16 to 20, who require 8 to 14 days to learn it, and, being paid by the thousand, earn 3½ to 4½ florins a week.

5. *Assisting in the pickling (dipping).*—The burner becomes greasy from the oil used about the machine and has to be purified by pickling. This work, very trying for the chest, is done by men; but girls are employed to arrange the burners or other parts on thin brass wire. When these objects have been pickled in a solution of zinc and acids and rinsed in pure water they are dried in sawdust in a revolving cylinder, after which girls clear away the sawdust with brushes &c. This sedentary work is very easy, and is generally done by quite young persons (16) or old women, who are paid 3½ to 4 florins a week.

6. *Assisting in the polishing.*—When the burners and other parts have been pickled they are polished, with bad beer or soap water first, and then with the burnisher or bloodstone, by men; and after this they are dried with sawdust and towels by girls. This sedentary work is also easy. Weekly wages 3½ to 4 florins.

7. *Varnishing* with fine hair brushes requires some attention; a worker, to become handy and skilful, must have at least three or four weeks' practice. The girls who are thus employed are from 18 to 24 years of age, they are seated to their work, which is so far fatiguing that it keeps them perpetually in a stooping posture. They are paid by the hundred and earn from 4 to 6 florins a week.

8. *Japanning,* in which there are various employments for girls. Metal lamps of the ordinary sort are finished completely by girls, who lay the colour on them with hair brushes. Some weeks' apprenticeship are requisite to this employment, as the colour must be uniform and in no part spotted. Metal shades varnished white are whitened by men, the girls laying on the ground colour, &c. These employments are suited only to strong persons, because the smell of the colours and varnish, and especially the dust of black lead (graphite) are injurious to the lungs. The payment weekly is 5 to 7 florins.

9. *Soldering.*—The actual soldering, called brazing (or hard soldering) is done by men; but the girls apply the solder in a room away from the furnace. The work is not hard and is this:—the worker mixes the hard solder with water and pounded borax, and with a small spoon puts this mixture on the seams or parts, spreading it equally. The objects thus prepared are laid on an iron grating, and taken by men to be annealed. Age of the girls 16 to 18. Weekly earnings 3½ to 4 florins.

10. *Cementing the glasses to the brass. The finest gypsum is mixed with water and a solution of gum arabic into a soft pulp, on a stone slab. The*

worker then arranges a number of glasses in front of her, 10 or 20 according to their size and her own skill, fills them with the gypsum stuff and then puts the metal on the glass. To make the objects perfectly straight, the glasses are put on small lathes and regulated with the hand. The principal requirement in this process is that the worker has an accurate judgment of form and does not turn out crooked work. Cementing can be learned in a week, and if the worker is industrious and attentive she can become very dexterous in a month. Payment is made by the hundred, weekly earnings vary from 4 to 7 florins.

11. *Inserting the wick and screwing on the burner.* Wages 4 florins.

12. *Packing the finished goods in paper.*—This is done by girls from 16 to 20, and requires an apprenticeship of two to three months, as each object must be nicely packed according to its shape. The work is not hard, is done standing, and is paid weekly according to the worker's skill with 3½ to 5 florins.

All processes of lamp manufacture are done with 10 hours labour per diem; in winter from seven to six; in summer from six to five, with one hour of rest, (12 to 1). The general health of the workers is good; their age mostly from 16 to 24. Some are older. The division of labour per cent. is as follows:—There are employed in *cutting* and *stamping* 33 per cent; *annealing* two per cent.; *pickling* the metal three per cent.; *making burners* seven per cent.; *pickling* yellow three per cent.; *polishing* two per cent.; *varnishing* four per cent.; *lackering* 20 per cent.; *soldering* two per cent.; *cementing* glasses four per cent.; cleaning glasses four per cent.; screwing on burners four per cent.; packing 12 per cent.

In Vienna about 250 to 300 girls are at present employed in this industry.

Manufacture of Tinned Metal Cooking Utensils.

Women are employed: 1. In tinning the vessels, which requires about four weeks practice to learn. 2. Cleaning them with cotton rags and small brushes. 3. Packing the finished goods in paper. Work 2 and 3 requires no previous knowledge, is easy and simple, and not in the least prejudicial to health. *Tinning.* The vessel, first pickled by men, is dipped, with iron pincers, into molten tin, the surface of which is covered with grease (tallow or palm oil, &c.). The grease that adheres to the vessels as they emerge has to be thoroughly cleaned away with rags, tow, or brushes, &c., and the article is again dipped in the tin and again cleaned. The cleaning is always done by girls, as is also the tinning of small articles. Most of the women employed are from 16 to 30 years old; some are older. They are the wives and daughters of workmen living in the neighbourhood. Their wages are from 4 to 6 florins, average 4½ per week. Women might further be employed in the easily acquired manipulation of cutting the metal plate and wire, perforating sieves, &c., done with small presses, and requiring no exertion of physical strength.

Manufacture of Buttons for Gloves, and of Tobacco Pipes.

1. *Button making* is done with very ingeniously constructed machinery on a large scale, and for export to America. The process, in which as many girls as boys are employed, is the following:—Brass plates are put under a press worked by steam, which stamps out a number of capsules at one operation. These are the upper parts of buttons. A second machine cuts the lower parts of the buttons, a dozen or more at once, and with the same operation the small holes for the eyelets. These two machines are worked by men. In a third machine the eyelets are made of brass wire. The eyelet is inserted by a woman, and riveted in its place by a turn of the machine. A pellet of paper is inserted in the upper part, which is then stamped into union with the already finished lower part, in the stamping machine, and a final machine presses the design. The girl must hold under the stamping machine one of the parts in each hand, whilst she causes the stamp to fall on them by a movement of her foot. She has to lay the finished button, with the eyelet downwards, into the "designing" machine, and work that also with her foot. When she releases the pressure with her foot the button springs out of itself. Steam could not be applied to this, because it would be

impossible to insert the parts at the precise moment required underneath the descending stamp, and the girl might easily injure her fingers. These manipulations are entrusted to girls of 14 to 20, the younger at the stamping machine, the older at the final "Façon" machine. The work is sedentary, and is acquired by 14 days' practice. The 30 women employed make an average of 240 dozen buttons daily, earning 1½ to 3 florins, sometimes 4 florins a week.

The finished buttons having been silvered or gilt are polished. This is done by girls on lathes turned by steam power. The worker, leaning over the lathe, takes a number of buttons in the left hand, fixes one after the other on to the lathe and polishes it with the burnisher as it revolves, and then lets it drop into water. The work is not fatiguing, but only the older girls are so employed, who earn three to four florins per week.

2. *Manufacture of pipe bowls.*—(*a.*) Painting the bowls. The pictures printed with a copper plate are painted by girls and boys, in one colour. Wages 3 fl. 60 kr. to 4·60 per week. (*b.*) Making the mountings. Girls are employed in perforating the mountings, with small presses, and in polishing the finished goods. Wages 1½ to 3 florins, also 4 florins per week. Working hours, excepting Sundays and holidays, 12 hours a day, *i.e.*, from 6 to 12 and from 1 to 7.

Type Founding.

A number of operations formerly only performed by boys and men have now for years been exclusively committed to women and girls, who have shown themselves quite fitted for it. These are:—1. Knocking off the break of the types, *i.e.* the wedge shaped piece that adheres with its pointed extremity to the foot of the casting of letters. This is easy work, sedentary, and requires no previous knowledge. Wages three to six florins per week. 2. Grinding the letters on two sides by rubbing them on hard red porphyry (clinkstone). Each letter has to be laid down with the left hand, and two fingers of the right hand then laid upon it press it over a space of 10 or 12 inches to and fro upon the stone. One side thus ground, the letter is turned with the thumb and ground on the other side in the same way. This is also sedentary work. Moderate suppleness of finger is required, and moderate strength of the right arm, to carry on the work with speed all the day long. Three or four weeks suffice for learning the work, which (like No. 1) is paid for by the thousand, and at which earnings are regulated by industry and dexterity ranging from 3 florins to 10 florins in a week. (3.) Setting up the finished letters into long rows. Long, narrow, lightly made, wooden composing sticks, 2½ feet in length, are used, &c. This work is done by young girls seated, is not fatiguing, and requires no previous knowledge nor intelligence, but only a moderate degree of manual dexterity to pick up the letters quickly and arrange them regularly. Earnings depending entirely on industry and dexterity, range from 2½ to 6 florins per week. (4.) Other employments. Since the great strike of the type founders in 1870, girls have begun to be successfully employed in other processes, *e.g.* in casting on the machine. The machine is self-acting, is turned with one hand, and requires no guidance. The difficulty of this work lies in the arrangement of the parts of the machinery to fit the different breadths of the letters; but this is overcome by fairly intelligent girls with four to six weeks' tuition. This work is also by no means laborious, but very remunerative. The first earnings are five to six florins a week, easily reaching 8 or 10 later on. The vapour of lead that is given off, and the high temperature of the workshop, requires to be met with healthy lungs and sound nourishment, and perfect cleanliness of habit. In Vienna, from 200 to 300 girls are employed in the various foundries, 40 per cent. in grinding, 30 per cent. in setting up, 20 per cent. in breaking, and 10 per cent. in casting. The majority of the working women, when once used to casting, hold to this branch, and advance from the easier to the harder and more remunerative employments, which they are the more enabled to do that the business continues all the year round fairly uniform in activity, and is subject to no so called "dead season."

Wood Industry.

Manufacture of Wooden Roller Blinds.

1. *Winding off or Spooling the Yarn.*—The spooling wheel used for this work is set in motion with the right hand, while the left hand guides the thread, which must be wound in a regular spiral on to the spool. The work is not fatiguing, and is done sitting. Girls from 12 to 15 are employed. The winding machine is, however, most commonly used; this is set in motion with the right foot, or by means of steam power. It requires great care, as 10 to 12 spools are wound on it at once. Strong girls only, from 16 to 24 years of age, are employed at it. It taxes eyes, arms, and feet. Weekly wages 5 to 7 florins; average 5 florins.

2. *Warping.*—As soon as the spooling has delivered a sufficient number of spools, these are put in order on to the warping mill and the threads of the spools threaded through the eyes. Then begins the warping, which, like the former, is an easy task; for this work girls from 15 to 24 years of age are employed, who earn an average of 5 florins weekly.

3. *Weaving.*—This is very hard work, the introduction of the wooden shavings among the threads of yarn necessitates long practice, and the closing up of the "lay" with the left hand requires strength. Women of 18 to 30 years of age are employed. The work is done standing; it is fatiguing to chest and feet, and none but persons of robust health are fit for it. Five or six weeks practice are required for learning it, and it is paid for by the piece; the earnings of the women amount to 5 or 7 florins; average 6 florins a week.

4. *Cutting out the Wood Stuff.*—When a piece of the wood stuff has been woven by the above process, it is taken from the loom, cut out with large scissors to the required dimensions, and rolled up piece by piece. This work is done standing; it may be learned in eight days, and is entrusted to girls of 16, who earn from 3 to 5 florins a week; average 4 florins.

5. *Mounting.*—Firstly, the ends of the threads are untied, and passed through holes in the lower wooden rod, then fastened with a wooden pin and rasped even. The upper part of the blind is nailed with porcelain headed nails to a wooden roller; and, finally, the "halyards" are passed through porcelain rings made fast to the roller at the top. A far better arrangement for the halyards is a small machine fixed in the centre of the upper roller, by means of which the blind can be fixed at any desired height, and the trouble of the cords at the side is avoided. The easy work of mounting is sedentary, and women of less strength can be employed. Their age is generally 14 to 24. They are paid by the piece, and earn weekly from 3 to 4½ florins; average 4 florins.

In general women are employed in this manufacture, but men are also employed in the weaving. The work is continued all round the year, and work is seldom suspended. The working day is of 11 hours: from 7 A.M. until 7 P.M., with an hour of rest at noon. A quarter of an hour is also allowed for tea. The work is all done in the factory. At Vienna about 150 women are thus employed at present.

Wood Carving is the employment of thousands of men, women, and children. The produce of some provinces, an object of house industry, *e.g.* in the Grodnerthal (Tyrol) forms an article of international trade. Up to recent times a chief recommendation of this work has been its incredible cheapness; but this accounts also for its deficiency in artistic value. In spite of the remarkable dexterity of the wholesale makers and the unceasing occupation of all the members of their families, they are only able to earn a very modest subsistence. Improvement has supervened from the recent establishment of technical schools in various parts, as at Hallein, Mondsee, Hallstadt in Upper Austria, Innsbruck, Imst, Groeden in the Tyrol, Tachau and Wallern in Bohemia, Wall, Meseritsch in Moravia, and Gmund in Carinthia. The character of the designs has been raised and better tools introduced into use, and, thanks to the inborn talent of the people, a great improvement in this branch of industry may be confidently expected.

Manufacture of Furniture of Solid Bent Wood.—This branch of manufacture employs thousands of girls and women, partly at their homes, partly in enclosed

establishments. Their tasks, which are too simple to need description, are: 1, Rasping and filing, &c., the bent pieces of wood; 2, polishing; 3, plaiting the cane; 4, packing (in straw). Plaiting is a house industry at which women of all ages are employed. At the other branches the work is begun, according to its nature, at the ages of 14 or 16 or even 18 years. Payment is by quantity.; earnings are therefore dependent on industry and dexterity. Plaiting renders from 2·80 to 5 florins; polishing, from 3·40 to 7 florins; rasping, &c., from 3·20 to 8 florins; packing, from 4½ to 6 florins per week. About 5,000 women are employed, 25 per cent. at rasping, polishing, &c., 46 per cent. at plaiting, and about 4 per cent. at packing. In the factories especially, the conditions of labour are very favourable. The processes are all simple, and with some attention, easy to carry on.

Manufacture of Stone, Earthen and Glass Ware, Syderolite (Terralith) Stone Ware, and Porcelain, and especially Porcelain Buttons.

The first-named has of late employed women:

1. For moulding (with plaster moulds). The women employed in this are mostly from 15 to 25 years of age. They earn between 3 and 7 florins; their period of apprenticeship lasts about eight weeks. On the whole, the dexterity required is moderate, excepting for large pieces.

2. Painting, gilding and bronzing the baked ware requires appreciation for colour and good taste. The required manual dexterity may be acquired in an apprenticeship of 6 to 8 weeks. The earnings range from 3 to 7 florins a week; the age of the workers is mostly from 15 to 20.

In the manufacture of stoneware women are employed:—

1. *In Painting.*—The degree of skill required is regulated by the nature of the design, and by the painting of the object before or after it is glazed.

2. *In Glazing.*—Neither of these occupations is fatiguing or detrimental to health. In the factory of Land C. Hardmuth, in Budweis, the daily work being of 10 hours, the weekly earnings are by the first process four to seven florins, and by the second four to five. The finest painting is done by men.

In the Prague porcelain and earthenware manufactory at Smichow, the chief produce of which is porcelain buttons, which upholsterers consume in large quantities, women are employed:—

1. *In Sorting the Gravel*—the object of which is the removal from it of all impurities, especially iron. The two girls thus employed earn half a gulden per day.

2. *Turning Moulds.*—During their year of apprenticeship, girls are at first employed to make small cheap objects, *e. g.*, sauce-ladles and mustard-spoons, &c.; and when they are skilled more costly objects are entrusted to them, *e. g.*, vases, toilet services, &c. They are paid by piece from 1 to 20 kreutzers. Beginners can thus earn 2 to 3, and more skilled workers 5 to 6 florins a week.

3. *Glazing.*—When vessels have been once annealed and cooled, girls, in the annealing house, dust them and plunge them into the glazing substance. This is a process that requires great care, because the value of the production depends on the accurate measurement of the time during which it is dipped. The glazing is next cleared away from the foot or bottom of the vessel with a knife. The women are paid so much per furnace, and earn about four florins a week.

4. *Baking in Designs.*—In this process women are employed to cover the engraved plate with printing colour, to pass it between two cylinders by which the print is transferred to paper, and to fix this paper on the porcelain.

5. *Polishing the Finished Ware.*—The gold, which comes dull from the furnace, has to be polished. Paid by piece the women earn by this work 60 kreutzers per day.

6. *Sorting the Finished Ware.*—To eliminate faulty articles. The women thus employed have also to carry the vessels into the store. Daily wages, 60 kreutzers.

7. *Manufacture of Porcelain Buttons.*—The substance, in strips, is fed by one woman into a machine, of which another woman turns the motive wheel. The buttons fall out, and when they are dry are dipped by other women into glazing, and laid in sagger, finally sorted, the shanks (or spikes) cemented on, and the finished buttons (or nails) are made up in packets of 250, 500, or 1,000, with the help of a counting machine. The girls thus employed are remunerated by the thousand buttons, and earn about two and a half florins a week, working 11 hours a day. Their ages vary from 15 to 30.

Several employments attached to this branch of manufacture require a high degree of artistic education and appreciation of design and colour harmonies. They would therefore be promoted by a proper system of technical education of the workers.

Glass Manufacture.—To be divided into manufacture of vessels of capacity, blown, and window or table glass; also blown and not ground on the surface: further of mirrors, in which the table glass for grinding is either blown or cast and finished at one establishment, or more rarely sold unpolished to refiners; manufacture of chandelier glass, &c., of glass rods, from which ornaments and other articles are made; of glass tubing, used for making other articles or by glass blowers. There are also smaller smelting furnaces which produce 'composition,' *i. e.*, glass with a greater quantity than usual of metallic substance, which is again made into rods or tubes, or stamped in moulds. The rule of this manufacture is division of labour, the conjunction of several of the above processes being found inconvenient. The chief parts of the work, such as the preparation of the substance by the glass smelter, and its working by the glass maker, require all a man's strength and endurance, and are therefore done by men. Boys are employed to carry the objects prepared by the glass maker to the cooling pot, and to help in various ways, by which they are instructed for their future employment, and girls are not employed to assist in these tasks. Grinding conclave glass and mirrors, engraving, and cutting also require man's strength. The grinding is done in buildings apart—the grinding-mills—which are generally worked with water-power, and rarely by steam. The glass is ground on proper apparatus of steel, iron, stone, and wood, the glass surface being ground with a mixture of water and fine quartz sand. Engraving or glass cutting is done in large factories, and in large refineries in separate workshops; but in German Bohemia (Hayda, Steinschoenau, &c.), it is commonly a house industry. Emery and oil are used for glass engraving, the work being done on small machines driven with treadles, by means of small copper or steel wheels.

For subordinate occupations in the glass manufacture, women are employed:—

1. *In Sorting the Broken Glass.*—Broken glass is a considerable part of the material from which glass is made, producing uniformity in smelting (only for the finest crystal glass it is not used). It is therefore bought in large quantities by the manufacturers, but in mixed quantities of every description of glass, including coloured glass, which have to be carefully sorted by women.

2. *In Pulverising the Raw Material.*—Most of the materials for glass manufacture come into trade in lumps or pieces, requiring to be mechanically reduced, *i. e.*, ground or crushed. Softer materials, such as clay, chalk, and charcoal, requiring no great exertion of strength, are reduced or pulverised with wooden mallets, generally by women.

3. *Washing and Cleaning the Glasses.*—The glass having been ground or cut, has to be freed from sand, &c. Women wash, rinse, and dry it on cloths, and then carry it to the packing stores.

4. *Polishing the Gilding, Deadening, and Silvering.*—Painting and gilding concave glass, and flat, is done in German Bohemia as a house industry; but in other places in proper workshops. Hitherto it has been mostly done by men, but girls might be much more frequently employed than they are. In most places the custom prevails for the painter to bake his own work; this double task would perhaps be too severe for girls, and for this reason they are less frequently employed in the painting; but with most articles it is very possible for

the burning to be done by a *third* person. The only process generally entrusted to women at present is that of polishing the gilding, *i.e.*, rubbing away from it the dull deposit that comes over it in the furnace. Our Bohemian looking-glass manufacturers (there are no others in Austria), produce for the most part small looking-glasses, and employ women to deaden the tables and silver the mirrors. The plate being ground rough and dull, is first fine deadened and then polished. Part of this work is done by girls. Also silvering the medium sizes of mirrors with tin and mercury. A proper number of sheets of tin foil, spread flat and rubbed with quicksilver, are laid on the silvering table, which is a perfectly smooth stone, enclosed in a wooden frame, with a gutter in it. A quantity of quicksilver is than poured on the tin-foil, and the plates of the looking-glasses scoured bright are laid on it, and pressed down with pieces of lead, so that the superfluous quicksilver is pressed out from under, the silvering table being tilted, the fluid metal is caught in the gutter and flows away, and the mirror is left weighted down for several hours or days, according to size, that the silvering may adhere.

This work, when the mirrors are not too large, is by preference allotted to women, because experience has shown that they are somewhat less rapidly destroyed than men by the deadly effect of the quicksilver upon their health.

5. *Tying up the Goods in Straw*—The packing in cases is done by men.

All these branches of woman's work are such as require no special previous knowledge, and can be learned thoroughly in two or three months. Painting and gilding, however, require technical school education. The women employed in the glass factories are mostly old, most of them are widows having no other occupation. The prevailing age is from 30 to 60. The workers generally belong to the neighbourhood in which their work lies. But Bohemia not only employs the greatest number of workers but supplies foreign glass manufactories with Bohemian workers also. The average earnings of the women are 10 florins a month at sorting broken glass, 14 florins for polishing, deadening, and silvering, and 12 florins at all other tasks above named; besides which (in most of the manufactories) they have lodging and firing free, and a quarter of a yoke ($=\frac{1}{3}$ of an acre, English) of ploughed land for their own use. They number, in Bohemia 2,500, and in all Austria-Hungary 3,980 persons, of whom 20 per cent. sort broken glass; 30 per cent. pulverise raw material; 10 per cent. clean the glass; 10 per cent. polish, deaden, and silver mirrors; and 30 per cent. tye straw.

Manufacture of Prisms for Chandeliers, and of Glass Ornament.

This branch of glass manufacture, principally carried on in the districts Gablonz and Tannwald in Bohemia employs a great number of women. They are not applied to the production of the raw glass, but in refining, which contains two completely distinct classes of work, glass grinding and bead blowing. *Glass grinding* involves sharpening, cutting, and polishing prisms, and similar objects, in grinding mills driven by water power. The apparatus contains so-called "wheel frames" &c. The work is seldom done by women. From the sharpening and grinding the glass is passed on to the wood polish, or polishing disc, which being smeared with a solution of tripoli earth is made to revolve at a great rate so that the glass held against it is brought by the friction almost to smelting heat, and acquires its superficial brilliancy. This polishing is almost exclusively woman's work, and can be learned in 8 or 14 days; but to acquire skill and certainty that the object may not become distorted by mismanagement of its position on the disc requires longer practice. The workers sit to their work, have to hold their hands all day in cold water, and inhale dust of glass and tripoli earth; they are in consequence much subject to diseases of the lungs. They are commonly quite without education, and are sent by their parents, for the sake of their earnings, at so early an age to this work, that they not only neglect their attendance at school, but are stunted in growth. The ages of the workers range, in general, from 12 to 30. They are for the most part, natives of the Gablonz and Tannwald

districts, seldom from other parts. Their earnings are very precarious, from 1½ to 3 florins a week at the utmost. The grinding, &c. establishments are all situated over rivers or streams, the workers live at home. Their dwellings are little wooden huts devoid of every comfort, and many of the women, certainly all those having large families to maintain, undergo great privations; hundreds among them have no beds but sacks of straw; their food is little else than coffee and potatoes; too much of their pay is spent on dress and finery. The custom of most of these families is that children, small or large, pay one or two florins a week to their home, for their board and lodging, and dispose as they please of the rest of their earnings. Such conditions are naturally not favourable to the moral training of the children, and its evil results are manifested in the culpable conduct of adults. The health of this industrial population is not good. The lung diseases already mentioned arising among the glass grinders are hereditary; the people cannot afford medical assistance, and there are many places to which the nearest doctor is one or two hours distant, *e. g.* Maxdorf, Antoniwald, Josefsthal, which form together a community of 2,300 souls, but have no doctor among them as yet. The nearest doctor is an hour's journey distant, and when called can often not attend before the second or third day.

In addition to the grinding mills described above, there are a large number of apparatus for use in the house turned by treadles and a flywheel. The stones are horizontal, with a water cask suspended over them, and are used for grinding small objects, such as buttons, beads, &c. This easy work is mostly done by women and occupies entire villages, many a house containing four or five of these contrivances. The week's earnings amount to 1 to 2 guldens. The work is less injurious to the health than the other. The workers can live to the age of 50 or 60.

B. *Blowing Glass Beads.*—Numerous families are maintained, in the mountain districts, by the production of blown glass beads, an industry mainly conducted by women. The very simple apparatus consists of a square table, under the cover of which a hollow cross is introduced. A bellows, worked by a treadle, and from 1 to 1¼ ells long, according to the size of the table, is between the legs. The draught through the hollow cross streams on all four sides of the table, through holes in which a funnel of wood or brass ends in a glass point, before which stands a lamp, by the flame of which the glass is heated to white or melting heat as required. The work is done seated. For beads, hollow rods are used, of white and of coloured glass, and transparent or opaque, and of a composition more easily melted than ordinary glass, so that the lungs are less tried in the blowing than they are by the same work with ordinary glass. Women who make "mirror beads," that is, beads with a mirror effect inside, have, in front of their flame, an ordinary metal spoon containing a smelting of lead and tin, which substance they insert in the open bead, &c. This work prevails in the villages of Antoniwald, Maxdorf, Marienberg and Prichowitz.

Another process of combining metal in the composition of glass beads is, when they have been blown of transparent glass or composition (10 or 20, according to size, from one glass tube), to fill them with a solution of nitrate of silver, &c., and when the silver is deposited so that the beads reflect, the water is let out and each bead filed down with a steel file. Besides these objects, pears and other objects are blown, by the unaided hand or in moulds. The moulds are fastened to tweezers on the working table, and connected by a line with the treadle, so that they can be rapidly opened and shut. This is important, because the glass substance hardens very quickly, and when it is hardened cannot be blown into the mould. The places where this work is most cultivated are Maxdorf, Josefsthal, Karlsberg, Grafendorf, and Antoniwald. A good number of these articles, such as fruits, ornamental beads, and such things are painted on the inside of the bead with cold colours, or wax colours by girls.

For learning the processes described one or two years are required. A great difficulty is the constant variation of the article, and the perpetual demand for new processes to produce new and modern designs. No school education is required, but a great deal of practice. Bead blowing is not, in itself, pre-

judicial to health, nor difficult. Even children are employed, and old women of 70 or 80 years. The bead-blowers are all natives of the seat of their industry. Their mode of life is poor, like that of the grinders; frequently two or three families herd together in one room, containing, often, two or three working tables, with four women working at each—12 persons being thus at work together. From this arises an unhealthy closeness, which, with the smell of the petroleum used acts very prejudicially to health. Their earnings are precarious and uncertain in the extreme. There are kinds of work for which 7 or 8 florins a week are paid, but there are others at which more than 1 or 1½ florins cannot be earned. Besides hollow beads, solid objects are manufactured over the lamp, such as buttons, ear-rings, needles, &c., by the production of which, 1½ to 2 florins a week, with board, may be earned.

The number of girls and women working in glass manufacture in the districts Gablonz and Tannwald is about 4,000, of whom 15 per cent. grind, 5 per cent. work at the treadle machine, 60 per cent. at the blow flame, 5 per cent. thread beads, and 15 per cent. at all other work.

Small Ware Manufacture.

Imitation Meerschaum.—In working up refuse of meerschaum into material women are employed: (1), in sorting the refuse, by sifting; (2), washing and cleaning it; (3), rubbing it through silken sieves. These tasks are performed by persons hired by the day; generally women between 18 and 40 years of age, who after long practice, and in proportion to their skill are paid four to six florins a week. The work is done standing, and is fatiguing to arms, chest, and feet, and none but strong persons are employed, generally such as have worked at building. Most of these workers come from Bohemia and Moravia. The work is continued without interruption all round the year. About 60 women are thus employed in Vienna at present.

Manufacture of Smoking Requisites of Meerschaum and Meerschaum Composition.

Women are employed:—

1. *To rub or polish with Shave Grass* the dried pipes or cigar tubes—which were first rubbed with fish skin or with glass paper, and recently also with flint paper, to get rid of the so-called water skin (upper surface)—after which they are rubbed with the sharp rush (horse tail or Dutch rush), and finally finished with the fine rush. This sedentary work is done by women, from 14 to 40 years of age, and requires good eyesight, a light and dexterous hand, and care. Apprenticeship, four months; weekly wages, 4 to 7 florins, average 5. Some workers on contract are able, by their skill, to earn 8 or 10 florins a week at this work. It is generally done by the workers in their own homes, thus enabling them to attend also to their household duties.

2. *Boiling* the objects in wax, spermaceti, or other fatty substances, and dusting them afterwards. The work is done standing, requires attention and minute precision; it fatigues eyes, arms, and feet. The workers' ages range from 14 to 40; their weekly earnings from 3 to 5 florins, average 4; their apprenticeship is three weeks during which they are paid 1 florin a week.

3. *Rubbing* with a linen rag on the index finger of the right hand, dipped in a solution of bone ash. The work demands care to avoid breakage, &c. Wages, 3½ to 6 florins; average 5. Apprenticeship as No. 2.

4. *Polishing and Finishing, i.e.*, cleaning with medium hard tooth brushes polishing with chalk and spirits, and finally rinsing and washing clean with soft napkins. *This work is only entrusted to experienced polishers. Good*

eyes, a sure hand, care and skill are required. Eyes and arms are most fatigued. The workers' ages are from 20 to 30. Their wages from 5 to 8 florins, average 6 florins a week. Polishing and rubbing are partly done as house industry. The day's work is usually of 10 hours, besides the intervals of rest and the business continues uninterrupted throughout the year. It employs in Vienna about 500 women; 50 per cent. at the first-mentioned process, 10 per cent. at the second, 30 per cent. at the third, and 10 per cent. at the last.

Manufacture of Fancy Leather Goods.

Women are employed:—

1. *Stitching by Hand, i.e.*, good needlewomen only stitch together the pieces of velvet, silk, and leather, of which the articles are made. The age of the workers is from 16 to 24. The work is sedentary, and requires precision and dexterity. Weekly wages, 4½ to 7 florins; average 6 florins.

2. *Machine Stitching.*—This work is considerably more fatiguing than the other, and various kinds of machine are used, viz., single and double chain stitch, and the so-called shuttle machine; the two first-named are used exclusively for stitching silk, linen or woollen stuffs, the last only for leather. The work is done seated. Eyes, chest, arms, and feet are taxed by it. Ages, 18 to 26; weekly earnings, 6 to 9 florins; average, 7 florins. Necessary previous acquirements:—perfect skill in using the sewing machine. Apprenticeship, 4 to 6 weeks.

3. *Sewing* on wadded linings in squares or diamond pattern; requires taste and precision, and is entrusted only to the best workwomen. Age, 16 to 24; wages, 5 to 9 florins; average, 7 florins.

4. Outlines, ornaments, &c. stamped on the object require to be painted in with a brush. The brush is charged with water, diluted vinegar, sal ammoniac, and eggwhite; and prepares the design for leaf gold, which is then laid on, by an older worker, with the index finger and the so-called gold knife. The gold leaf is first cut out on a leather pillow marked with chalk. This work requires great attention and patience, and the girls engaged upon it have all passed their apprenticeship at the outline painting. The first process (outline painting) is done by girls of 15 to 17; the second by girls of 18 to 24 years of age. The former earn 4 to 5 florins, the latter 6 to 7 florins a week.

5. *Varnishing.*—This process, which is neither difficult nor fatiguing, consists in painting over outlines and impressions with the finest varnish. It requires a steady hand, and considerable attention, and is done seated. Previous knowledge is not necessary, and the whole process can be learned in a few hours. Age, 14 to 16; weekly wages, 3½ to 4½ florins; average 4 florins.

Women are, in general, only employed in the manufacture of leather fancy goods, in the processes above described; but it would be very possible to materially enlarge the sphere of their industry, especially in the production of the cheaper sorts of goods, and to transfer to them many occupations now given to men. The workers belong mostly to the classes who, although they have to work for their living, are able to give attention to the education of their children. They are therefore in addition to their school acquirements skilled in ordinary woman's work. They commonly enter the factories at the age of 16 or 17, and continue there until they marry; none are less than 14, few more than 30 years of age. Their employment continues without interruption all the year. They work 10 hours daily from 7 to 6, with one hour of rest at noon, and a quarter of an hour for coffee. The work is done in the factory. There are, at present, about 250 women thus employed in Vienna; 30 per cent. at the hand stitching; 20 per cent. machine stitching; 10 per cent. at the next process; 20 per cent. gilding; 10 per cent. preparing outlines for gilding; and 10 per cent. varnishing.

Manufacture of Fancy Goods of Bronze and other Metals.

1. *In Electro Gilding Bronze Goods.*—Women are employed—(*a.*) To hang the objects on wires, for dipping into the gold bath. Young girls do this, who are gradually promoted to harder tasks; weekly wages, 4 to 4½ florins. (*b.*) *Gilding, i.e.*, dipping the object in the solution, working the galvanic battery, taking up the object at the proper time, then rinsing it in pure water, and handing it over to another girl to be dried. Wages, 5 to 7 florins; average, 6 florins. (*c.*) *Drying* in a box full of sawdust, in which it is agitated until the sawdust ceases to adhere to it, and then brushed over with a dry brush. Wages, 4 florins. (*d.*) *Scraping, i.e.*, cleaning with elastic brushes of brass wire, which are dipped in bad beer or a decoction of soapwort. Wages, 4½ to 6 florins; average, 5 florins. The workers should be robust to resist the influence of the vapours of the corrosive chemicals; coarseness of skin is also an advantage in this respect. (*e.*) *Covering up.* It happens often that some parts of an object are to be gilt, others silvered or oxydised. In such cases the object is first gilded all over, and the gilding is then covered with a composition (a solution of asphalt), excepting the parts to be silvered, before it is plunged in the silver bath. The composition is scraped off again when it emerges from the silver bath. This occupation requires attention, precision and a steady hand, to preserve in sharp relief the outlines of the engraved designs or relief ornamentation. Wages, 6 to 9 florins; average, 7 florins.

2. *In Polishing the Gilded or Silvered Objects.*—This is done sitting, but requires strength, and five or six months' practice. Wages 6 to 14 florins; average 7½ florins.

3. *In enamelling by Gold Process.*—Engraved impressions are filled with prepared fluid colours, and the object set to dry slowly on a warmed iron plate, being carefully protected from dust. The work is uniform, requiring only steadiness of hand in guiding the paint brush, that it does not leave the engraving. Wages 6 to 10 florins, or average 7½ florins.

4. *Inlaying Stones, Coral, or Pearls in Bronze.*—A very quiet and pleasant occupation for girls. The bronze article, before it is gilded, is bored after a design at the places where the stones, &c. are to be inserted; then it is gilded and finished. The stones &c. are then picked up with a small roll of wax fastened on to a handle, and inserted in the prepared holes, previously moistened with cement. This work taxes the eyesight and requires great neatness, but no especial previous knowledge beyond such apprehension of shades of colour as girls acquire in knitting patterns, &c. Age 15 to 20; earnings 4 to 8 florins; average 5½ florins a week.

5. *Cutting the Metal with Buhl Saw.*—The manipulation is difficult, requires attention and some knowledge of design, fatigues the eyes and chest. It is not therefore a favourite occupation with girls and women, although only the simpler and easier work is given to them. The design to be cut is fastened to the sheet of metal, which has previously been hammered quite smooth; small holes are then bored in all the parts that are to be cut out, through which the saw is to be introduced. The design is then cut out. The time required to educate a skilled metal cutter depends on the strength and tenacity of the metal, the quality of the saw, and the difficulties of the curvatures. The average apprenticeship is of two years; but it takes many years to bring this skill to artistic merit. Payment is made either by piece or by the week; earnings range from 8 to 14 florins; average 9 florins. Workers begin this work at 18 to 20, and continue it many tens of years, as it is permitted to be done at their homes.

6. *Laying on Solder.*—The soldering is done by men, and women are by rule excluded from work with fire, but in some places they are employed to apply the solder, mixed with water and pounded borax. It is a very easy task, done away from the solder furnace, sedentary, and learned in a few hours. Ages 14 to 18. Apprenticeship eight days. Weekly wages 3 to 4 florins.

The working hours in this industry are universally 10; from 7 to 6 with an hour of rest at noon. Employment continues without interruption through the year. All the tasks but gilding are sedentary. In Vienna about

200 girls are engaged in this branch of industry, 45 per cent. in gilding, 15 per cent. polishing, three per cent. enamelling, 10 per cent. inserting stones 20 per cent. cutting out, and 7 per cent. laying on solder. In exceptional instances women are employed in stamping small objects in thin metal sheeting. The woman holds the plate under the stamp, and presses down the lever. For this manipulation considerable strength is required, and it is trying to the chest. Apprenticeship eight days. Ages 16 to 24 years. Weekly wages 4 to 6 florins, average 5 florins.

Manufacture of Metallic Buttons and Fancy Goods.

Women are also employed in the manufacture. The processes are as follows:

1. The round metal disks are forced, by a hand press, through a contrivance which gives them a bulging shape, by girls of 15 and upwards, whose weekly earnings are 4 to 5 florins. The cup shapes thus produced pass on to the chemical laboratory where they are gilded and are then—

2. Polished with bloodstone on a lathe driven by steam. The weekly earnings of the women so employed are 5 to 6 florins; their ages range from 18 upwards.

3. The useless metal inside the hollow is scooped out with a hand press and a contrivance contained in it, by girls of 15 and upwards, earning 4 to 5 florins a week.

4. *Enamelling by Cold Process.*—This is done with fine spirit of wine lac, with a fine brush of badger hair, by girls of 15 and upwards, earning 3 to 4 florins a week.

5. *Cutting out Hinges.*—The hinge joints with which the commoner sorts of shawl pins, &c. are fitted are cut out on a hand press, with a peculiarly constructed contrivance for cutting and boring, by girls of 16 and upwards, earning 4 to 5 florins a week.

6. *Framing* is done on a small lathe turned by steam power. The separate parts of the finished goods, as frame, portrait, cover, &c., are laid together in one place by little girls. The worker who has to join them collects them in a brass form on the upper end of the lathe, where they are held together by a spring which is regulated by a lever, and the frame fitted on by the help of a peculiarly shaped steel implement. The assistants in this process are from 15 to 17 years of age, and are paid 2½ to 3½ florins weekly wages; the workers who manage the framing are from 18 upwards, and earn from 5 to 7½ florins.

7. *Hand Polishing.*—Age 18 and upwards; wages 5 to 6 florins.

8. *Setting imitation stones.*—Ages from 17 upwards, weekly wages 4 to 6 florins.

Manufacture of Umbrella Frames, and Parts thereof.

1. *Ferrule Making.*—This work is still carried on in some factories without the use of steam power, by girls of over 16 years of age, by means of a hand press of moderate size (about 200 lbs. weight), on which the round discs of iron or brass are cut, and then pushed several times through narrow passages until they are of the required height; they are then stamped conical. They are turned and polished on the turning lathe, and oxydised by chemical process by men. To protect the ferrules from the influence of the atmosphere they are varnished. This and the packing of them in paper parcels are done by girls of 16 and upwards. An experienced worker earns, working 10 hours daily, 7 florins at pressing the ferrules and 9 at varnishing, which requires great cleanliness and a delicate hand.

2. *Making the Slides and "Crowns."*—These indispensable parts of the frames of umbrellas and parasols are partly made by girls of 16, in the

following manner :—The square plates of metal having been cut by machine, are rolled into tubes by a hand press and prepared for soldering, by a girl. The soldering is done by men. Their subsequent scouring, cleansing from forge scales, putting on rings at both ends, and laying on solder for soldering the rings, &c. is done by girls of 16. After these processes the frames are soldered, turned, and filed, by men, and returned to women for the insertion of springs in the slides with a hand press; after which they go to the japanner. When the slides are silvered or gilt, they are entrusted to girls for dipping in the gold or silver bath which the chemist prepares for them.

3. Mounting, packing, adjusting, and sorting the finished frames or parts of frames, are exclusively done by girls over 16 years of age. This work requires great cleanliness and practice, and knowledge of the goods, to sort out faulty pieces; and good taste in making up the parcels. For this work the rule exists of selecting only girls educated in the town. Their weekly earnings are 6 florins. There are other parts of work, in the manufacture of the ribs and guards, done by girls of 14 and upwards, whose earnings, according to their skill and industry, vary from 3 to 6 florins per week.

Paper Industry. Manufacture of Paper.

Women are employed :—

1. *To sort and cut the Rags.*—The former, according to fineness and degree of wear they have undergone; the latter, by spreading them out between both hands and slicing them against a sickle-shaped blade, or else by a proper apparatus, moved by water or steam, called the rag-cutter. The girls employed to sort and cut rags in the paper mills of Lower Austria, which are situated near the Hungarian frontier, come from the neighbouring Hungarian villages, inhabited by Slaves. They generally set out from their homes on Monday mornings, provided with food for the whole week, and sleep in the factory, where they are also provided with appliances and fuel for cooking. Their daily work is of 9 hours, for which they earn 3 to 5 florins a week; the whole of which they generally take undiminished to their homes on Saturdays.

2. *Boiling Rags.*—Simply filling the cauldron with them and removing them boiled. The remarks on the previous category apply to this; wages, 4 to 5 florins.

3. *Counting, Glazing, and Packing the Paper.*—After the spoiled sheets have been detected and sorted out, the paper is laid, sheet by sheet, between zinc plates, and passed several times to and fro through a glazing machine, by which it acquires a peculiar glaze. In some factories so called "calanders" are used instead of the glazing machine, which uses no zinc plates, but on which the pressure is not so great nor the glazing so sharp. The paper is then packed. The workers in this class are frequently daughters of the men employed at the paper mills, who have been educated in the factory school and thus acquired a better education than those under classes 1 and 2. Their dwellings in the worker's houses are good, and dry and well warmed in winter. Hospital rooms are prepared for their reception in case of illness, &c. Their weekly wages are 4 to 6 florins. Their number in Lower Austria may be estimated at 1,100 to 1,200.

Manufacture of Wall Papers.

It is seldom that female labour is employed in this industry, but, when boys are scarce, little girls of 12 or 14 are employed to follow the painter who lays on the ground colour, to smooth or equalise his work, also to assist in laying colour on a cloth with which the painter works. Both of these tasks are easy; the hours of work, for children as well as adults, are 10½ per day, viz., from 6 to 12, with a pause of half an hour at 9, and then from

1 to 6 in the evening. About 12 little girls are employed in Lower Austria, earning 2 to 3 florins a week. Women may also be employed in laying on metal to so-called "gold" paper hangings. This work has been in isolated instances successfully entrusted to women, who have shown their capability of learning it in one day, and earn 5 to 6 florins a week. But the article is costly and without large demand. It can, therefore, never become an important branch of woman's work.

Manufacture of Playing Cards.

Women spread starch water on the sheets of card and hang them up to dry, sort the cards and pack and seal the packs, earning 4 to 6 florins, or an average of 5 florins a week.

Bookbinding, Manufacture of Pasteboard and of Envelopes.

The employment of women in bookbinding is restricted by the want of proper workshops, and still more by the minutely retail character of the trade, chiefly occupied in binding separate books to order for private persons. In larger workshops, where binding is done for the trade, girls and women are employed in folding and in stitching, for which they are paid partly by weekly wages and partly by the piece: their earnings range from 3 to 7 florins, average 5 florins per week. Women are further employed in gilding, an occupation requiring peculiar care, and better remunerated; wages 6 florins. Also for varnishing; easy work, wages 3 to 5 florins. Other kinds of bookbinding work are considered too hard for women.

Manufacture of pasteboard articles is well suited for the employment of women, in sewing, glueing, cutting out stuffs, &c., for which delicate handling and dexterity are required. The harder parts of this work, cutting out book covers, &c. are done by men. Wages, 3 to 8 florins, average 6 florins per week.

Manufacture of envelopes is mostly done by women, but the cutting out of the paper by men. Wages seldom exceed 3 to 6 florins; average 5 florins.

The females employed as above are mostly girls, and range from 13 up to 30 years of age. The few adults employed are generally wives of men employed in the manufacture. The hours of work are from 7 till 6, with an hour for dinner. The number of women at this work in Vienna is about 600, 40 per cent. folding, &c., 20 per cent. pasteboard working, 30 per cent. envelope making, and 10 per cent. for other work.

Manufacture of Lead Pencils.

1. The grooves planed in the wood are smeared with glue, the leads inserted, and the wooden covering laid over, after which a certain number are screwed into an iron frame. In the factory of L. and C. Hardtmuth at Budweis, 24 women thus employed earn 3 to 4 florins weekly.

2. Planing the pencils by machinery. The only work required is to serve and attend to the machine by laying the pencils in an iron groove in which they are planed round or 6 or 8 sided; 50 women thus employed earn 3 to 4 florins weekly.

3. Polishing can be learned in 3 or 4 weeks, but not satisfactorily; 70 women are thus employed.

4. Tying up. 20 women are engaged on this work, weekly earnings from 3 to 5 florins.

Graphic Arts and Industrial Drawing.

There are various easy occupations in printing, for which it is customary to employ only women, such as :—

1. Laying the paper into the press. This work requires great precision, only to be acquired by practice of several weeks' duration. The work is done standing; the daily hours are ten, and the weekly wages 5 to 7 florins, or for night work upon newspapers 7 to 8 florins.

2. Removing the printed sheets and laying them in order; simple and easy work, done sitting; weekly wages $3\frac{1}{2}$ to $4\frac{1}{2}$, average 4 florins; night work, 5 to 6 florins, average $5\frac{1}{2}$ florins. Some presses have an apparatus for doing this work automatically.

3. Various kinds of handiwork, such as cutting labels, cards, &c., folding, &c.; wages, according to skill, $3\frac{1}{2}$ to 6 florins; average $4\frac{1}{2}$ to 5 florins.

4. Messengers' and porters' work; average wages, 5 florins.

About 1,000 women are employed, in all branches, in the print manufacturing establishments of Vienna, their ages varying from 16 to 40. Girls are also put to composing in the municipal printing offices at Prague, and after two or three months' practice earn 6 florins, and after a year's experience, 12 florins or more per week. The Government printing establishment at Vienna employs women in founding type, in manufacturing postal and revenue stamps and envelopes, and in gumming stamps. Wages are as under: — (1.) The persons employed at type founding earn 4 to 8 florins; average 5 florins a week, with 10 hours daily work. (2.) Manufacture of stamps and envelopes. For laying the sheets under the printing press, at 11 hours daily work, the wages are 5 to 9 florins; average 7 florins per week. For the easier work of removing the printed sheets they average 3 florins; the sheets are perforated by the press in two places, and required to be fixed on two wires, for convenience of cutting out the stamps, &c. This simple but fatiguing labour is learned in 14 days, and is paid with 4 to 5 florins a week. (3.) For attending a machine which folds and gums stamped envelopes, a work requiring care to avoid dangerous contact with the machinery, the wages are 4 to 5 florins; average $4\frac{1}{2}$ florins per week. (4.) Preparing the adhesive part of the envelopes, 4 to 6 florins; average 5 florins. (5.) Sorting the envelopes for the removal of goods of defective manufacture, 4 to 6 florins; average 5 florins. (6.) Counting the envelopes, 6 to 8, average 7 florins. (7.) Perforating postage stamps. This is done by a machine managed by a man; the work of the girl attendant is to lay the sheets of stamps in a proper frame for the machine, and to remove them perforated from the frame. Wages 4 to 5 florins; average $4\frac{1}{2}$ florins per week. (8.) Making up envelopes, correspondence cards, &c. in packets of 100. Wages, 4 to 6 florins; average, 5 florins a week.

Spreading adhesive substance on to the backs of stamps is almost exclusively woman's work, at which the State printing offices employs 15 workers, whose wages vary from 5 to 7 florins, or an average of $5\frac{1}{4}$ florins per week; and who are all from Vienna and its immediate neighbourhood.

Lithographic Printing.

In this branch of graphic industry women have as yet been employed only for subordinate and poorly remunerated occupations, offering the workers no opportunity of advancement such as they might obtain if they would devote attention to the work of lithography previous to the printing. Neither the designing in chalk nor the engraving with the needle, or diamond (used for finer work) offer the least technical difficulty in requirement of strength of wrist. The work is of a nature that after long practice can be done by any girl. But a main condition, which must go before practical application, is thorough education in drawing. The drawing schools of the Austrian Museum for Art and Industry at Vienna, in which none are admitted but properly prepared and talented scholars, and the existing schools for completing female education (Weibliche Fortbildungsschule) offer to girls the means of acquiring this: so that the possibility exists for women to acquire better positions in lithography also.

Designs for Manufacture, Wood Cutting, and Oil Colour Printing.

The above remarks are also applicable to these industries, which have hitherto been exclusively pursued by men, but open a remunerative field for female labour.

Photography.

In the development that photography has undergone the employment or women in the ateliers has become universal. The girls (rarely women) are employed:—1. In the laboratory to prepare the glass plates (clichés) and to fix and varnish them after the operation; wages 8 to 10 florins: average 8 florins. 2. In printing copies from the negatives; wages 6 to 10 florins; average 8 florins. 3. In "touching up" the pictures with water-colour and brush. The girls generally begin with the easier work, filling in white spots on the pictures. When they have acquired practice by experience they are promoted to more important work, such as "touching up" larger pictures and negatives. For the small pictures they are paid 6 to 10 florins: average 8 florins a week; and a skilled "retoucher" of large pictures and negatives can earn 60 florins a month or more. 4. Colouring portraits, 60 to 70 florins a month.

Most of these girls work in the ateliers, only a few being employed at their houses, in which case they are paid by the piece. They are of all ages from 15 upwards, but most of them (in Vienna) from 20 to 30. Their hours of work are in summer from 8 to 12 and 1 to 6, and in winter from 8 to 4 without interruption.

Although something has been done, and especially by the schools of the "Frauen-Erwerb-Verein" (Society for the Promotion of the Employment of Women) in the education of girls for photography, it would be very beneficial if the schools for industrial drawing, that of the Imperial Royal Museum for Art and Industry, and other educational establishments, would devote more attention to training girls in retouching and colouring; employments that would offer even to the daughters of respectable families a pleasant and remunerative occupation. It would further be very good, as has been often suggested, that a special school for photography, such as exists in Berlin, should be established in Vienna, admitting girls. The good results that might be achieved thereby, are indicated by the success of a school for retouching work in Vienna founded by Fräulein Antonie Bogner, although this has only existed a short time, and is of very modest resources. The number of girls employed in the photographic ateliers in Vienna exceeds 450, of whom 2% are in the laboratory; 33% printing copies; 60% retouching; 5% colouring and retouching large pictures and negatives.

Machinery and Means of Transport.

Manufacture of Carding Engines.—Since the discovery of the cardsetting machine the employment of women in this manufacture has considerably diminished. The insertion of the teeth (formerly the exclusive work of women and children) is now done by the machine, which is not fit for management by women, by reason of their dresses, and is now attended to by boys. Women are also deficient in the technical knowledge necessary for regulating the machine, which is done by a skilled locksmith, and the finishing process is too hard a work for women. Nothing remains now therefore for the women to do excepting trimming up the teeth; *i.e.*, removing the defects left by the machine, inserting teeth where they are wanting or replacing defective teeth by perfect ones. The teeth are made by the machine. There are hardly more than 60 women employed in this manufacture in Austria. Their earnings vary according to locality, where weekly wages are the system these hardly exceed 3 florins; by piece work twice as much is earned.

Scientific Instruments.

Employment of Women in the Telegraph Service. Women are employed in the larger stations of the Austrian telegraphic service under the following conditions:—They must be unmarried, more than 17 years of age, healthy, and have passed a satisfactory examination in various kinds of handwriting (caligraphic, running, and legal) and in technical knowledge of the apparatus; they must also show that they are acquainted with the regulations of the telegraph service. They must take a pledge of secresy, the violation of which will be followed by their instant dismissal. Their engagement is terminable by six weeks notice on either side. Their regular work is between 8 a.m. and 9 p.m.; alternating from 8 a.m. to 2 p.m., and from 2 p.m. to 9 p.m. If they are placed on night service, the duration of which is limited to 8 hours, and its occurrence to once in five days, they are paid extra, viz., in Vienna, 1½ florins; in Trieste 1 florin. There is no night service but in these two towns and there only exceptionally. The regular salaries of the telegraphists, which are paid for actual attendance, and forfeited for every day of absence are:—*for telegraphists instructed in the use of the Hughes apparatus, and those who exclusively work at the receipt of messages, 25 florins a month and tantième: for all others 20 florins a month and tantième (and fee for night service). After the expiration of two months' satisfactory service the regular salary of 25 or 20 florins is increased by 5 florins; and the telegraphists stationed in Vienna are allowed further an increment terminable at will of 5 florins per month.* At small stations, upon the above-mentioned conditions, the official in charge is allowed to employ his wife, for whose service he is himself held responsible. There are at present 120 women in the telegraphic service of the state, and it is intended to employ 38 others.

The women employed by the Vienna private Telegraph Company, are under similar regulations excepting those of celibacy and age. The regular wages of these persons are between 480 florins and 240 florins a year + *tantième.*

Attendance on the Hughes apparatus is rather fatiguing and exhausting. Doing three times the work of the Morse apparatus, it also strains the attention. The employment of women has produced the best results.

Musical Instruments.

Mouth harmonicas. Wages at various operations of this manufacture range from 4 to 6 florins a week. Hand harmonicas: women are employed to glue leather on the 'tone channels,' earning on an average 5 florins a week.

The females employed in these two branches of manufacture enter on their work for the most part after completion of their 16th year, and remain engaged on it until they marry. Their occupation continues uninterrupted throughout the year. The working time is ten hours daily, 7 to 12 and 1 to 6, or on Saturday until 5. Part of the work is done by the workers at their own houses. This manufacture employs, besides 600 men, about 200 women in Vienna and the neighbourhood.

Building and Works of Civil Engineering.

The employment of women in the building trade is limited to the masons' and plasterers' work, is mostly assistant work only, and consists in slacking lime, carrying sand, making and carrying mortar to the place of its use; and in assisting the plasterer.

If we assume (according to experience), 40 to 45 day labourers (women) to work a million of bricks in a year, 240 to 250 millions of bricks having been used in Vienna in the year 1872, it appears that from 10 to 12 thousand women are employed in this work. In the winter months about one-third of these are occupied in cleaning windows, doors, &c. of the new buildings, and fetching and carrying water. The women fallen out of employ by the decrease of building operations mostly go to their homes in the winter months, and devote themselves to their household work. They are paid

75 kreutzers a day in the winter months, and 80 kreutzers to a florin in summer. The women employed at the plastering receive about 20 per cent. more, and number from 400 to 600 in Vienna.

Manufacture of Chalk and Gypsum.

In the chalk quarries commonly adjacent to lime burning establishments women are employed to break the lumps small with hammers and to wheel them on hand barrows out of the quarries.

The work is not fatiguing for women of average strength. Girls begin to do this work therefore at the age of 14 years, and continue to do it to extreme old age. Most of the workwomen of this branch in Lower Austria come from the south-west of Bohemia; very few from Lower Austria. Their weekly earnings vary between 3 florins 60 kreutzers and 7 florins 20 kreutzers, the wages of the majority are about 4 florins 80 kreutzers. The women's mode of life is adapted to their earnings. They are generally married to chalk burners and quarrymen and dwell partly in labourers' houses together; partly with the neighbouring peasantry. The whole number of women employed in the quarries for chalk burning in Lower Austria is about 150.

Chalk and Gypsum Manufacture. Women are not employed in the hard labour involved in manufacture of white chalk, nor generally in that of Portland cement. One factory of the latter employs 8 or 10 women; some at the clay-cutting machine, some sorting the cement after the burning. Their wages are 4 florins 20 kreutzers a week, for 10 hours daily work. One establishment in Lower Austria for the manufacture of sulphate of lime and gypsum employs 16 women, to remove broken stones on a train to the furnace. Wages 4·80 to 5 florins 20 kreutzers for 10 hours work.

Agriculture: Forestry and Cultivation of the Vine, the Orchard, and the Garden.

Silk Cultivation.

The stages that the production of silk passes through are divisible into two principal classes; the first concerns the production of the silk spinning moth; the other the treatment of the silk thread obtained, up to the moment when it is delivered to the trade prepared for various manufacturing purposes.

The first named moiety of the task, the proper cultivation of the silk-worm, is a business which requires an extraordinary degree of pains, patience, and liking for the pursuit, and it appears eminently adapted, precisely on account of these required qualifications, to be carried on by women. All silk cultivating countries testify to their fitness for this work.

Fraulein Jenny Krause, who has cultivated the silk-worm in Styria for many years with the greatest success, shows us in a glass case a representation of the silk-worm cultivation arranged in an interesting and clear manner. Bushes arranged in overarching groups (straw of rice or twigs of the birch tree), serve the worms at the time of their change to the chrysalis state for spinning in. The so-called cocoons, of which about 400 go to the pound, are the produce of their spinning; 10 pounds of cocoons scarcely yield more than one pound of silk. Inside the cocoon lies the yellowish brown "skittled-shaped" pupa, which turns to a butterfly in about 14 days, and then creeps out through a little hole to his career of life of a few days, and, after he has paired and produced eggs, he dies.

From the cocoon which it is wished to use for the production of silk, the butterfly is not permitted to escape, the pupas being killed on the tenth day by fumes of sulphur.

In order to dissolve the gummy substance that glues the threads together the cocoons are thrown into hot water. The ends of several cocoons are found twisted together a little, and then wound off. Another person lightly touches the swimming cocoons with a straw of rice and removes the curly fibres hanging upon them. The thread obtained by winding off, to which however only a part of the spun cocoon is adapted, comes into trade as raw silk. Only available for the lightest kinds of stuffs, it is necessary, in order to meet the requirements of manufacture, to twist together two or more threads.

According to the strength of the twist that is required, a distinction is made between tram silk (the weft), and organzine (the warp).

The outside and inside husks of the cocoons are refuse and can be used as such, but are of small value. In trade they are known by the names floss silk, floret silk, flurt, terret, &c. The cocoons that have been eaten through by the butterflies are profitably applied in preparation of "chappe," the use of which has increased greatly in consequence of the increasing dearness of proper silk.

The chappe proves to be not only an excellent substitute for stuffs of the lighter quality, but has grown to be indispensable in some branches of textile industry; for example, in the manufacture of shawls.

Forestry.

In the timber drifts and steam saw mills the following is the work that is done by women:—

(*a.*) Clearing away the refuse that falls on cutting up timber into finished material, such as posts, planks, lathes, &c.—the so-called drones and skins.

(*b.*) Clearing away the short ends cut off in shortening timbers to fixed lengths, and carrying it on trucks to its destination.

(*c.*) Landing and arranging firewood from the firewood drift; and after it is dried loading it into the vessels.

(*d.*) Carrying and arranging light cut timber, such as planks, posts, and laths, into regular order for the purpose of drying it.

(*e.*) Carrying the sawdust from the sawing machines to the furnaces of the boiler of the steam engines.

The above work demands a strong and healthy constitution; those persons especially who work in the interior of the saw-mill must have eyes and lungs free from all defect, for the fine sawdust affects those organs severely. The working women, of various ages, generally come from the neighbourhood of the saw-mills. Their weekly wages are from 3 fl. 30 kr. to 4 fl. 50 kr. The average is 3 fl. 60 kr.

Kitchen and flower gardening.—The women are employed in loosening and working the soil (hoeing and manuring it), planting, weeding, watering, and preparing the vegetables of the kitchen garden for the market. The last work consists of cleaning the vegetables and removing the parts unfit for food, so that the goods may get a good appearance and be properly prepared for use. It may be assumed that one third of the women are employed for the coarser work, one third for the intermediate work, and the remaining third in preparing the goods for the market. It takes them generally from one to two years to learn their duties. They require to be strong and muscular; their labour is trying and especially liable to affect the spine, because a great deal of it is performed in a stooping posture. The women employed in this branch of labour about Vienna nearly all come from Lower Austria, and from the neighbourhoods of Horn, Schrems, Gmünd, Waidhofen on the Thaya, &c.; their ages vary from 19 to 30 years. Their weekly wages range from 1.60 fl. to 2 fl., the average is 1.80. The women live with their employers and are boarded by them. The number of workwomen employed in the market gardening trade at Vienna is about 300, and about the same in ornamental gardening.

Chemical Industry.

Manufacture of Chemicals.

In the manufactures of sulphuric and muriatic acids, &c. females are only employed for the work of an ordinary day labourer, such as unloading coals and minerals from the railroad cars, unpacking glass bottles from the straw packing, washing the glass and stone ware required for the chemicals, &c. For these purposes the wives of the men at work in the factory are generally employed, at daily wages varying from 70 to 80 kreutzers.

Manufacture of Candles and Soap.

Here we have to distinguish:—*a.* The manufacture of stearine candles. *b.* Of tallow candles. *c.* Of soap for washing and manufacturing purposes. *A special branch of the soap manufacture, namely, toilette soaps, belongs partly to perfumery and is mentioned under that head.*

(*a.*) *Stearine candles.*—In this manufacture the lighter parts of the work are done by females, that is,—1. Threading. This work consists of passing the wick through the tin mould. The wick has to be hung upon a little hook by which it can be drawn through the candle. The end of the wick is passed through a hole in a little iron disc and knotted, so that the wick can be pulled tight and fastened in the centre of the mould. This is not laborious work, but it requires sharp eyes and supple fingers; it is therefore only given to young girls from 18 years to 24 years of age. Their earnings are from 75 kr. to 80 kr. daily.

2. *Filling the moulds.*—The stearic acid is poured into the tin moulds from pewter vessels. For this simple work old women are generally employed. The limbs most taxed by it are the arms. Wages from 75 kr. to 80 kr. daily.

3. *Shaking out.*—This work requires some exertion, as there are always from nine to 12 candles and the overflow to be taken out of the moulds at once. The exertion tells most upon the arms, no special skill is requisite. Earnings from 70 kr. to 75 kr.

4. *Cleaning and Cutting.*—This work is done by old women. The candles are simply laid out on the machine and a circular saw cuts them down to the proper weight. This requires neither strength nor skill. Wages 65 kr. to 70 kr.

5. *Stamping.*—Every candle has to be stamped with the mark of the factory, which is very easy work, as the candles, being all of one length, have only to be pressed against the stamp, which is warmed by steam. The women who are least clever are set to this work; they earn daily from 65 to 70 kreutzers.

6. *Polishing.*—The polishing is done with a machine in which the candles are rubbed bright with flannel, all that the attendant has to do is to lay the candles on to the machine one after the other. This easy work is also given to old people to do. They get for it from 65 to 70 kreutzers.

7. *Packing.*—Only the younger women are employed in this branch of the work, because a certain amount of dexterity is required for fastening the labels, packing the candles in the paper, and tying up the packets. Wages 75 to 80 kreutzers.

As the work of the stearine factory that is done by women is such as requires no special skill, the class of women who principally find employment in it is that which has not the education or the patience required by another calling. The circumstance that the manufacture is larger in winter leads to the employment of the women who find work in the summer as bricklayers by the day. The four manufactories of stearine candles in Lower Austria employ altogether from 350 to 400 women.

(*b.*) *Manufactories of tallow candles* only employ women for weighing out and tying up in bundles the dip candles, tying up the mould candles in bundles, and packing up the argand candles; the candles are made by men. In weighing out the dips, which are never all of one size, the women must be sharp sighted enough to distinguish the greater from the less. The number that go to make one pound of each kind is settled precisely; a pound may contain 10, 12, 14, 16, 20, or 24. But to make each bundle weigh an exact pound big ones and little have to be mixed judiciously in the arrangement. The work is easily learned in a few days. The bundles are made up by threading them with a kind of iron skewer. Mould candles are made in tin moulds. When they have been cut by the workmen to the proper weight they are made up into bundles, according to their kind, of 8, 10, 12, 14, 16, 20, 24, and 30 together. This is done by women. The argand candles are packed in paper parcels by the women. Nearly all this work is done by the shop girls as an occupation for their leisure time. They board and lodge in the house and are paid from 7 fl. to 10 fl. a month.

(*c.*) *Manufacture of washing and rough soaps.* The only part of this manufacture done by women is the cutting up of the soap into pieces. It is done by means of a machine, is very simple and not fatiguing. Wages daily 60 to 80 kreutzers.

The manufacture of paraffin candles employs women.

1. *To twist the wick.* 2. *To arrange the machine.* The work is not fatiguing. Both are easy to learn and require no practice, only great precision and

accuracy. 3. *In pouring.* This operation involves close attention to the right degree of heat of the liquid mass and to the moment of its congelation; and the regulated admission of steam and water. *It* requires therefore intelligence and a superior faculty of observation. 4. *To cut off the wicks, turn out the candles, and carry them to the tables.* Very easy work, requiring neither strength nor intelligence. 5. *Docking and Stamping.* For this dexterity, quickness, and some muscular strength are requisite. 6. *Packing,* which requires much experience.

Manufacture of Toilet Soaps and Perfumery Goods.

A. *Toilet Soaps.*

1. *Cutting the soap.*—This is done by a proper machine, which, by means of a wire, reduces large blocks of about 100 lbs. into bars. A man is employed to feed the machine, and girls from 18 to 24 years of age to remove the cut pieces. The bars are cut by another machine, attended to by girls, into small pieces of one loth to one pound weight each. This involves rather hard work. For French sorts the prepared soap is cut from the blocks with a planing machine and dried; the dried shavings are then compressed in a mill. The soap is then coloured and perfumed, and compressed in another machine into bars. *The weekly wages average from 3 to 5 florins.*

2. *Drying the Soap.* (*a.*) *in the room;* (*b.*) *in the stove.* The first is easy work and consists only in arranging the pieces of soap on a grating, where they are dried by the warmth of the room; in stove drying the soap is arranged on a grating and pushed into an oven made for the purpose, from which it is removed when it is thoroughly warmed through, and then compressed whilst in that state. But drying is only required for the second quality of soaps. Lifting the soap in and out of the oven requires some exertion, and no girls are employed at this work who are not of a strong constitution. The room drying is attended to by girls of the age of 14 to 16 years; drying in the oven by young women from 18 years to 24 years of age. The wages of the young girls amount to 3 to 4 florins; those of the elder ones to 5 to 5½ florins per week.

3. *Pressing the soap.*—The small squares are put under a grooved press by which they are squeezed into the precise model required. The work is more laborious than the other parts of this manufacture, though it can be done sitting or standing; the press has to be screwed up with one hand and a simultaneous tread with the foot; and the soap laid in and taken out with the remaining hand. For these combined movements none but girls of rather unusual strength can be employed. A skilled workwoman is able to press an average of 140 dozen pieces of soap in the day. The girls employed are from 18 to 24 years of age. Their weekly wages range from 3 florins to 5·50 florins.

4. *Drying and colouring the fruit soaps.*—This work consists in taking the fruit shapes of soap, produced partly by pressure, partly by cutting, and subsequently dipped in wax, and painting them with a brush into the imitation of the colours of the fruit required. The fruits are then hung up upon wires and varnished by other workwomen. With some kinds of fruit, grapes, for example, the glass berries are filled with perfume, tied up in bunches and ornamented with foliage. Of course the girls employed about this work are already skilled in flower making. The time of apprenticeship lasts up to one year. The girls so employed are from 14 to 25 years of age; their wages varying from 3·30 to 6 florins.

5. *Packing up the soap.*—This work, which is not laborious and is easy to learn, requires in the first place precision and neatness; it is done by girls mostly between 14 and 15 years of age. Their wages are from 2 to 5 florins a week.

B. *Manufacture of Perfumery Goods.*

The preparations of perfumes, oils, pomatums, powders, &c. is only entrusted to men; whilst the collateral work, such as (*a.*) unpacking and cleaning the bottles which are sent in from the glass works in bundles; (*b.*) filling the various perfumes, oils, fluid glycerine soaps, toilette vinegars, and waters of beauty into small bottles; (*c.*) filling the different pomatums, powders, &c. into boxes; (*d.*) corking, labelling, and adjusting—*all this is left to women, but it requires attentiveness and some practice. This work is not sedentary and not fatiguing. The girls employed in filling are of the age of 15 to 18*

years; whilst for corking, labelling, and adjusting, which requires greater skill and precision, older girls of from 18 years to 24 years are employed. The wages of these girls run from 3½ to 6 florins a week.

In making the wax pomatum the women have to pour the fluid into honeycombed moulds by which a hundred sticks are moulded at once. After refrigeration the overflow is shaved off the top with a sharp blade; the sticks of pomatum are knocked out of the mould, dried, packed in tin-foil, and the vignette attached. The week's wages for this work (in Prague) are from 2.10 to 3.20 fl. The duration of the work, that is, in the manufacture of toilette soaps and perfumery goods, is generally 11 hours. There is no dull season. In Vienna this branch of industry employs about 450 workwomen.

Manufacture of Tinder Goods.

In the production of lucifer matches women are employed in the following duties:—

1. *Bushbinding.*—This work, done by girls of from 13 to 16 years of age, is as follows:—The small strips of wood delivered by the planes have to be tied together into bundles of 500, and the ligatures placed at proper intervals, so that, when the "bushes" are cut down into lengths of lucifer matches afterwards, each bush will remain properly bound together. The work is sedentary, and only requires manual dexterity, which is acquired in a few hours. Weekly wages four to five florins.

2. *Laying down.*—In order to be able to cover the small strips of wood at one end with the sulphur and the kindling substance they must be arranged at proper distances. For this purpose the so-called frames are used, in which the slips of wood are laid by the workwomen by means of utensils which, according to the plan of their construction, are worked either with the right hand or with the foot. The woman sits down to this work, which, although the manipulation requires dexterity and attentiveness, is soon learned, so that the workwomen, who are of ages between 14 and 30 years, can earn, after two or three weeks' practice, a weekly hire of 4 florins; and after longer practice, five to six florins a week.

3. *Taking out.*—The lucifer matches, coming out of the drying rooms ready, have to be taken out of the frames in which they lie and filled into boxes or paper cases. This work, which the women attend to in a standing position, requires care and attentiveness, which must be especially directed to removing from the frames, before they are emptied out, all refuse, that is, broken splinters, or splinters not sufficiently covered with the kindling ingredient; to seeing that the required number of splinters is put into each case; and to take care that the cases are neatly packed. Cleanliness is especially required at this employment, and care that nothing is eaten in the workshop itself, and that no food is taken up with dirty or dusty hands; in order to prevent all this the manufactory provides separate eating rooms provided with washing stands. The "taking out" duties employ the eyesight and the hands, and are learned in three or four weeks. The workwomen, 15 to 30 years of age, are paid from six to eight florins per week, on an average six and a half florins.

4. *Rolling up.*—This process, a preliminary to making the lucifer-match boxes, consists in the preparation of cylindrical rolls of straw paper smeared with gum or paste. For this simple work, learned in five or eight days and performed standing, workwomen, between 15 and 30 years of age, are employed, earning from four to six florins a week, or an average of five florins.

5. *Making the lucifer match boxes.*—For this operation, the only one which is done outside of the manufactory, the workwomen are supplied by the manufacturer with the necessary materials, that is to say, the papers cut up to a proper form, to take home with them. The work is only to fasten the separate parts together with paste. In this easy and quickly learned occupation married workwomen, who are unable on account of their domestic duties to look for work abroad, find opportunity of utilising their hours of relaxation and are able, according to circumstances, to employ profitably such of their little children as are able to assist. The finished work is delivered at the manufactory and fresh work taken away once a week. Weekly wages three to eight florins, average six florins.

6. *Bottoming or sanding.*—This is covering the surface of the bottoms of the match boxes with gum or waterglass and then dipping them in sand. It is easy work, learned in a few hours, requiring attention to cleanness and neatness, and mostly done by old women or weakly girls. Weekly wages four to five florins. The age of most of the workwomen is from 18 to 20 years. With respect to the labour itself it is not injurious to the health if strict attention be paid to cleanliness, but the employées too often manifest a degree of carelessness.

As we have mentioned, all these tasks, excepting the preparation of the match boxes, are performed on the premises of the manufactory. An average day's labour may be taken at 10 hours, with a pause for breakfast of half-an-hour, at noon of one hour for dinner, and in the afternoon of half-an-hour for supper. The work is continued without interruption all the year round. In Lower Austria about 500 workwomen are employed in this manufacture, including the work put out to be done at home; this is distributed among bushbinding, 2 per cent.; laying in, 29; taking out, 30; rolling up, 4; box making, 30; sanding, 5 per cent.

Manufacture of Chemical Dyes.

In the actual manufacture of chemical dyes, whether by dry or wet methods, women are not employed in Vienna; some firms employ women for the most ordinary tasks (cleaning the coppers, &c). These women mostly come from the northern provinces on the frontiers of Bohemia; they come to Vienna in the spring, and return home with their savings at the commencement of the winter. Their earnings are from four to five florins per week. But there are not more than 30 such women employed in the whole of Vienna.

Manufacture of Starch.

In the manufacture of starch in Lower Austria, which involves many heavy and fatiguing tasks (carrying sacks of corn of one and a half metzen, &c.), men only are generally employed. This is generally the case in Vienna. A starch manufactory on the plains of Lower Austria, which works off about 100 centners of wheat in a day, employs, besides 30 men, 10 females; but the latter only on the drying ground and drying rooms for breaking the pieces of starch into smaller pieces, and for weighing out and filling one pound parcels. These workwomen, from 18 to 30 years of age, must not be very delicate, for they have to carry lumps of starch weighing 20 lbs. from a lower to an upper storey for one hour in every day; and have to accustom themselves to the very great variations of temperature which exist in winter between the drying room and the external atmosphere. The women earn for eleven hours' work per day from 60 to 65 kreutzers. Women are also employed in the starch manufactory at Oedenberg. The manufactories of potato starch in Bohemia employ strong well-seasoned workwomen, on account of their cheapness, in almost all the technical processes of this branch of manufacture. This is also the case in the many small manufactories of potato starch in Moravia. Their training requires only a few weeks.

The distribution of working women among the various industrial groups, leaving out the insignificant numbers, is in the western half of the empire as follows:—

Group III. Chemical Industry, circa 7,500.

Group IV. Articles of food, circa 16,100.

Group V. Textile industry and clothes, circa 95,800.

Group VII. Metal, circa 2,300.

Group IX. Stone, earthen, and glass ware manufacture, circa 5,700.

Group XI. Paper manufacture, circa 7,700.

The numerical proportions of female labour between the Duchy below the Enns (including Vienna) and the other provinces of the western half of the empire vary as $\frac{2}{3}$: 1 and 1 : 1; only in Group IV., *the proportion is about 6 to 1.*

The COMMERCIAL and INDUSTRIAL PROGRESS of AUSTRIA, up to the date of the first International Exhibition in Vienna, by Dr. H. F. BRACHELLI, and DR. F. MIGERKA, of the Ministry of Commerce.

The development of the internal economy of Austria during the sixth and seventh decades of this century, is as interesting in its historical and its scientific relations, as it is remarkable and significant in its bearing on the subject of international exchange. The figures that record the vigour and increase of its productive forces, are the statistical record of a period of development included in a few years and disturbed by many causes; but better fit than any collection of data gathered from any part of Austria's history to convert faith in her future and in her position of domination over the commerce of the world into unwavering conviction.

The year 1848 parts old from new Austria. The former, the absolutely governed State, whose territory, barred to the foreign world by high duties, prohibitions of imports and exports, a troublesome passport system, and an anxiously watched censorship, and traversed by customs frontiers within its own borders, fell into pieces which, in spite of the great and radical reforms of Maria Theresa and of Joseph, possessed no bond of organic connection among their political and economical institutions. In the majority of the provinces the peasant population were degraded to a position that bordered on serfdom. Labour was trammelled by the privileges owned by guilds; education pitifully neglected; intellectual life paralysed; literature and art, in their inability to evade the restraint of an executive hostile to thought, or to contract their energy to the representation of the insignificant; were devoid of any influence. In consequence of all this the resource of capital was very small, the power of independence was stifled, and self-reliance supplanted by blind idolatry of the foreigner.

New Austria, as the state after its change in 1848 was rightly characterised, owing to the pregnant history of that period, the ideas that have filled and agitated it, and its achievements in every province of human enterprise, appears, in spite of the shortness of the time since elapsed, as a new world. Henceforth a constant member of the international trading community in lively commercial intercourse with the rest, Austria has freed her peasant population from the traditional burdens of feudalism and her working industry from its trammels; while a system of education worthy of a constitutional state is bringing light to the lowest strata of society. The press is displaying its instructive and educational, deciding and guiding power; finally, the intelligent cultivation of the rich capabilities of the soil, as a sum of all the above, gives extraordinary strength to the power of raising capital.

This revolution can be indicated by a few figures. The export value of the completed manufactures in the fifth decade was 299, but in the seventh 1,637 millions of guldens. The import of completed manufactures at the former date 62, at the latter 652 millions; although Austria had in the meantime forfeited territory of 833·44 geographical square miles and a population counted at the close of the year 1854 at 5½ millions.

The mileage of railways in operation increased in this period from 218·49 to 1636·6; the Government lines of telegraph from 72·5 geographical miles, to 1847, to 4134 in 1871, or fifty-sevenfold. The traffic of private telegrams and private correspondence increased in the same period six hundred and sixty-eightfold.

The produce of iron increased from 3·9 thousand centners in 1848, to 8·6 thousand centners in 1871; of coals from 18·8 thousand centners in 1848 to 198·2 thousand centners in 1871.

The number of the Saving banks in the kingdoms and countries represented in the Reichsrath was 52 in the year 1851, and 184 in the year 1870. The numbers of depositors were 324,785 and 925,243 and the amounts of deposited capital 77,319,248 florins and 306,197,036 florins, at those dates respectively.

The powerful influence of joint stock enterprise, revolutionising the economical world, was applied before 1848 only to a few undertakings, but in 1871 it dominates almost every province of material production, with a share capital of more than 2,000 millions of guldens, of which more than 80 per cent. is devoted to traffic. And yet this development, as we have already remarked (and here lies its high general interest) was not the fruit of a steady, calmly progressive process of regeneration. On the contrary, the two decades brought into comparison contained struggles and crises of the most violent nature. The organism of the state was repeatedly the subject of shocks that imperilled the continuance of its existence. Experiments were made in such rapid succession in the legislative, political, and administrative order as to justify the bitter witticism that nothing in Austria is permanent but *change*. The destruction of the public credit was recorded in some truly humiliating conditions of loans, and in an eccentricity of the agio, the graphic illustration of which makes the outline of a comb with many teeth.

But we are impelled to ask what were the forces that counteracted these negative influences and produced the results superficially indicated above?

With the most condensed brevity we may answer, they were the great ideas suggested by Bruck, neglected for an interval but always taken up again; of the necessity of abolishing the limitations upon international and inland traffic; of the urgency of perfecting the organisations of communication and of credit; of the indispensable need of strict rule in the husbandry of the State as the basis of public credit; of the necessity of the introduction of foreign raw material and intellect into the country by the means of commercial treaties and the care of political institutions; the necessity, finally, of the liberation of home labour, and its careful development by education as the most active and permanent condition of economical prosperity.

The new period of our civilisation is inaugurated by the Imperial patent of the 7th September 1848, by which the system of serfdom was abolished in the Teuto-Slavonic provinces. Insuring to the peasant the undiminished fruit of his industry, it contained the germ of improved utilisation of labour, increased energy, and, as its consequence, increased productiveness of the soil, and increased capacity of consumption. But it did but hold the germ of this. This great measure, for obvious reasons, worked for years unfavourably. Agricultural enterprise, which had hitherto prevailed to a very considerable extent, found itself cramped by want of labour, owing to the competition induced by the increase of the manufacturing industry; the enterprising farmer class was wanting; capital was very scarce; and machinery as a substitute for human labour was as yet in embryo. The peasant, finally, as a necessary result of his long deprivation of liberty, had not grown to the level of his altered circumstances.

The year 1848 unhappily was also visited with pregnant events of the gravest character. Painfully, and at the cost of heavy sacrifices, the unity of the empire was established; but the state debt increased, confidence in the internal power of recovery was shaken, the silver coinage retired out of sight, paper money underwent a deep depreciation. To this *misère*, increased by the recurrence of political restrictions, came during the early years of the sixth decade epidemic diseases that spread over large provinces, the burden of a foreign war, and a very costly armed peace. When the Pontine campaign of the western powers ended with the peace concluded at Paris, it did not strengthen confidence nor the stability of the general position of Europe. It was followed by the period of "questions" that kept all the governments in permanent excitement and preparation for war. Then followed, omitting the sanguinary revolt in India, the Neuenburg question, the Schleswig-Holstein question, the Italian question. The insecurity of affairs abroad and the calamity of those at home, and the inevitable magnitude of the army budget, created in the country a sad and hopeless feeling of despondency, an inevitable reaction that was kept active by the great burdens of taxation, the expenditure of which was subject to no control. This was made still more depressing by a concordat concluded with the Pope, by which all expectation of a change for the better seemed postponed to indefinite futurity.

But the period of reaction had involved in its influence many of the great States; and, in the language of one of the leading journals of Vienna at that date, the world saw the principles of 1789 flourish in the principalities of the Danube and in Servia, and Montenegro in enjoyment of the sympathies of Europe, whilst nations eminent in intellect and wealth were struggling in vain after the attainment of a worthy political constitution. The outrage of Orsini and the internal condition of France ripened the Italian question. Villafranca is a humiliating memory to Austria of the loss, painful and bitter, of a rich province, when in mockery of the principle invoked Nice and Savoy were annexed by France. And yet this event had a healthy influence in rendering inevitable and not to be postponed a revolution in policy.

On 20 October 1860 appeared an Imperial diploma, which, apportioning legislative authority, declared the Landtags, and the Reichsrath proceeding from them, convoked to participate in legislation. Thus, after long, long interruption, constitutional conditions were again introduced at last. The preponderance of the Landtags and the consequent increase in strength of the *centrifugal force* was, nevertheless, a disturbance to the rejoicings at the event. A true appreciation of constitutional life was therefore not excited until the publication of the Fundamental State Law (Staatsgrundgesetz) of 26 February 1861, which referred it is true to the October diploma, but *with specifically emphatic allusion to the weal of the united monarchy*, and summoned a Reichsrath composed of two Houses.

By the provisions of this Fundamental Law the 203 members allotted to the Teuto-Slavonic provinces must be elected, out of and by the Landtags, out of the separate electoral groups of the members of the Landtag. One comprehensive Reichsrath for the whole empire, and another, more limited, for the whole empire, with exclusion of Hungary, were summoned. The Court Chancellories (Hofkanzlei) of Hungary and Siebenbuerg, were re-established; a Croat-Slavonic court of appeal (Hofdicasterium) was founded; the ministries of the Interior, of Education, and of Justice were abolished and replaced by a Ministry of State and a Council of Education, and the Ministry of Commerce abolished in 1859 was re-established.

The principle of equality of rights for all recognised religious creeds, and in every branch of civic and political life, found expression in the assurances of equality before the law that were given by the October diploma, and its realisation in the settlement of the relations between church and state, and in certain laws removing exceptional conditions.

The programme of the Government was indicated in the speech from the throne with which the Reichsrath was opened on the 1st May 1861. "Our "purpose is to show the world that the political, national, and church "differences that meet in such close contact and prevail throughout the "Austrian monarchy, are not obstacles to national concord, insuperable to "the mediating influences of advanced civilisation and to mutual forbearance "and conciliation." "Where the Government recognises its duty to protect "each nationality and give effect to the principle of toleration in the relations "of justice and commerce of the separate peoples of the empire, the state "affords adequate room for the unimpeded progress of the development of "the nation, and the surest guarantee of independence, rank, and power to "compel respect."

Expressive of firm will and enlightened appreciation, this declaration of policy found the liveliest adherence, the most joyful acceptance.

The order of government that now seemed firmly established for ever, revived the deeply depressed self-respect of the nation. Increased confidence, the anticipation of the regulation of the disordered currency system, and of the removal of the disproportion that existed in the husbandry of the state between assets and liabilities, found their appreciation in the rapid rise of the value of state securities, and the sudden diminution of the agio on metallic money.

Unhappily, however, month succeeded month and still the constitutional principle gained no ground, the erection of the fabric of the constitution sketchily designed made no progress. A great part of the monarchy persisted still in dumb passibility. Then came disasters, misfortunes, and extraneous

disturbances of serious kind. The provinces devoted to the cultivation of cereals were afflicted with a failure of the harvest. The cotton famine became a serious disaster for a branch of manufacture that employed thousands of workers; the lamentable position created in Russian Poland and Galicia by the Russian forced recruiting; the continuance of the necessity for maintaining a strong contingent in Lombardo-Venetia; the participation by Austria in the winter campaign against Denmark; all these causes continued to swell the army budget, made diminution of taxation and regulation of state finance impossible, and postponed the restoration of the currency. Faith in the vitality of the constitution was destroyed, and despondency returned, and when, unhappily, the parliamentary form of government found a hostile reception in other states, and its poverty of result in Austria, especially in respect of the national opposition that sprang up against it here, seemed to have given evidence of the failure of its vitality, the final suspension of the constitution met with but a feeble opposition.

The year 1866 is one of the saddest, the most painful. A campaign, reckoned by days (in spite of the victories won in the struggle with Italy by land and by water), brought about the loss of the still remaining Italian province, and was annihilating to self-respect. The rapid increase of the state debt by a series of pressing loans, the renewed depreciation of the currency, the infraction of the recently settled Bank Act were, under the scathing climax of the disaster of Koniggratz, scarcely felt. But the very magnitude of the misfortune, the suddenness of the fall, produced their own remedy, and, like the events of 1859, turned back the current.

The year 1867 records a complete revolution of the laws of Austria. In June the Emperor sealed the recognition of the Hungarian constitution and the new political entity by submitting to coronation, after ancient custom, as King of Hungary. The constitution granted to the provinces on the hither side of the Leitha, the six points of policy called the December constitution (21st December 1867), materially modified the constitution of February. The Ministries of the Interior, of Justice, of Public Worship and Education, were re-established, and Ministries of Agriculture and of National Defence were created.

A more significant expression of radical changes was conveyed in the recognition of the Italian kingdom.

Favoured by an uncommonly plentiful harvest, coincident with a failure of the harvest in several foreign countries, the institutions of commerce enjoyed unexpected prosperity, the home consumption of the products of home manufacture increased disproportionately, the agio sank, the paper circulation diminished. The burden of taxation increased by the treaty with Hungary and by the energetic order introduced into the conduct of the finances of the state, was borne with cheerfulness, the arrears of overdue taxes disappeared, the net of traffic grew to completion, a series of enterprises was founded and supported for the most part by home capital.

Public confidence increased as the financial government continued, by economical management, to meet the increased demands upon their resources, without recourse to the emission of new loans. Unhappily this development of prosperity was met by decided hostility on the part of the advocates of the principle of nationality, and attacked by them with ever growing pertinacity.

The rights awarded them by the constitution were their offensive armoury against it. Reiterated so-called projects of conciliation were ineffectual, resulting rather in the increase and spread of the demands advanced, because they were associated with an inopportune spirit of concession and confidence, and by a complete disorganisation of the ranks of the patry faithful to the constitution. Nevertheless, the final triumph of the federative principle was not long delayed, every endeavour being made to establish peace in the interior by persistence in building up the constitution and setting on high those principles to which, by the evidence of history, was due the preservation of Austria and the creation of *New Austria*.

This endeavour was supported and forwarded by circumstances occurring abroad. The permanent dangers that threatened European order, which had for many years compelled the continental states to perpetual readiness for war

and to the waste of the best of their powers, had at last given place to conditions promising continuance.

By the victory of Germany a system was overthrown that tended in foreign successes, however gained, to make France forgetful of her internal welfare, that raised terrorism to a guiding principle and the fact of brute power to the place of right.

With the restoration of constitutional conditions and vigorous and opportune reforms of the system of education, and realisation of all the principles of a strong and liberal minded government, the development of the social economy of the nation received a new impetus. As evidence of the increase of the wealth of the people, of the rise of the means of prosperity, and of the confidence of the foreigner, enterprises were multiplied, the transport system was perfected, traffic increased, the value of land rose everywhere, and, thanks to the happy management of the finances, the moment is near at hand when the long open wound, a depreciated national currency, shall be healed.*

M.

Foreign Trade of the Austrian-Hungarian Monarchy in the Period from 1851 to 1870.

The tables of the imports and exports of foreign trade enable conclusions to be drawn respecting the state's economical development; the growth or decline, in quality and quantity, of productive industry; the extension or the contraction of the power of capital; the increase or decrease of the prosperity of its inhabitants; and many similar matters; and these conclusions departing at least from a certain date, contain a high degree of probability approaching to the character of certainty. The necessary data appear to become reliable at the time when the Tariff of Taxation offered so small a premium on smuggling as no longer to compensate for its danger; and the simplification of custom-house procedure removed the temptation of evading it for its own sake; but principally when the sense of duty towards the state, strengthened by political institutions and education, branded smuggling, like swindling, with dishonour. All these influences have been rapidly increasing in power in Austria during the last 20 years. The economical development of Austria may therefore be fairly estimated from the statistics of her foreign trade, and the movement of commerce traced through the separate years, by value and by quantity, for that purpose.

These statistics seem peculiarly adapted to indicate the progress of the change and its result in the extension of home industry and the increased production of raw materials.

In the following statements therefore—setting out from the year 1847, as the last of a period differently conditioned and ruled upon different bases—the two subsequent decades will be represented by comparisons of import and export, in quantity and in value; to this will be added the gross commercial movement of the sixth and seventh decades, the percentage share of the different provinces, and finally the trade in transit; arranged in juxtaposition for comparison.

The articles are collected in four groups: Finished manufactures; Half-finished and auxiliary manufactures; Manufacturer's material; and Articles of consumption. The last has the lion's share of the exports, the manufactures intended for immediate use.

* Written in March 1873. (Translated by J. W. Mollett, B.A.)

TABLE I.

COMPARATIVE Table of the Value, in Austrian Guldens, of the IMPORTATION of Articles of the following Groups in the Foreign Trade of the Austro-Hungarian Monarchy :—

Year.	Finished Manufactures.	Sugar, Spirits, Beer.		Manufacturers' Material :— Half and Auxiliary Manufactures.	Meal Produce.		Articles of Consumption.
1847 -	8,656,011	10,983,339	19,639,350	68,562,394	309,954	68,872,348	47,614,265
1854 -	25,591,946	7,621,004	33,212,950	107,494,984	632,426	108,127,410	62,043,989
1857 -	65,279,246	6,719,875	71,999,121	130,627,272	824,177	131,451,449	51,594,512
1860 -	43,678,171	1,143,807	44,821,978	115,680,386	2,095,323	117,775,709	51,236,789
1861 -	34,916,711	1,189,054	36,105,765	124,312,763	2,258,508	126,571,271	51,094,097
1862 -	40,899,012	3,338,572	44,237,584	134,234,890	1,447,621	135,682,511	53,394,489
1863 -	45,833,686	2,040,512	47,874,198	144,683,285	2,609,708	147,292,993	54,190,499
1864 -	45,180,129	875,410	46,055,539	145,916,661	3,159,324	149,075,985	51,759,259
1865 -	42,830,116	768,068	43,598,184	153,052,766	2,771,824	155,824,590	51,331,025
1866 -	30,922,540	634,218	31,556,758	135,783,969	2,147,412	137,931,381	41,894,017
1867 -	55,195,437	754,804	55,950,241	178,791,633	2,136,264	180,927,897	49,574,285
1868 -	93,832,463	889,113	94,721,576	218,577,228	2,341,926	220,919,154	60,912,306
1869 -	124,195,579	1,316,962	125,512,941	222,453,634	2,901,172	225,354,806	61,568,524
1870 -	125,044,471	903,088	125,947,559	229,283,568	3,277,362	232,560,930	66,567,003

TABLE II.

COMPARATIVE Table of the Value, in Austrian Guldens, of the EXPORTATION of Articles of the following Groups in the Foreign Trade of the Austro-Hungarian Monarchy :—

Year.	Finished Manufactures.	Sugar, Spirits, Beer.		Manufacturers' Material :— Half and Auxiliary Manufactures.	Meal Produce.		Articles of Consumption.
1847 -	37,968,536	170,086	38,138,622	70,150,776	706,372	70,857,148	16,226,180
1854 -	80,515,183	311,878	80,827,061	127,856,713	557,072	128,413,785	14,472,581
1857 -	103,563,690	2,168,103	105,731,793	98,203,159	3,227,574	101,430,733	24,726,526
1860 -	121,655,560	1,636,966	123,293,526	85,641,014	4,989,264	90,630,278	38,881,638
1861 -	140,504,519	1,932,536	142,437,055	93,154,411	6,383,792	99,538,203	46,502,804
1862 -	130,618,628	1,128,435	131,747,063	115,174,882	7,091,684	122,266,566	39,332,332
1863 -	129,746,212	1,354,648	131,100,860	125,586,054	5,923,204	131,509,258	26,295,036
1864 -	148,165,073	3,428,492	151,593,565	134,286,810	6,587,656	140,874,466	28,261,110
1865 -	140,997,466	9,521,877	150,519,343	132,621,311	9,525,520	142,146,831	48,015,171
1866 -	140,160,210	7,817,780	147,977,990	121,964,733	10,661,272	132,626,005	45,621,312
1867 -	173,688,661	14,261,052	187,949,713	117,608,240	17,345,038	134,953,278	80,992,766
1868 -	169,247,568	11,658,498	180,906,066	124,785,536	22,466,352	147,251,888	97,215,436
1869 -	192,985,139	15,450,248	208,435,387	120,006,541	26,171,462	146,178,003	77,723,011
1870 -	180,877,536	23,200,336	204,077,872	110,545,149	23,673,162	134,218,311	53,081,117

TABLE III.

COMPARATIVE Table of Value of Foreign Trade of the Austro-Hungarian Monarchy (in Austrian Guldens).

Year.	Value of all Imports.	Value of all Exports.
1847 - - -	136,125,963	125,221,831
1854 - - -	203,384,349	223,713,427
1857 - - -	255,045,081	231,879,051
1860 - - -	213,834,426	252,805,442
1861 - - -	213,771,130	288,478,062
1862 - - -	233,314,584	293,345,961
1863 - - -	249,357,690	288,905,154
1864 - - -	246,890,783	320,729,141
1865 - - -	250,753,799	340,681,345
1866 - - -	211,382,156	326,225,307
1867 - - -	286,452,423	403,895,757
1868 - - -	376,533,036	425,373,390
1869 - - -	412,436,271	432,336,401
1870 - - -	425,075,492	391,377,300

TABLE IV.

COMPARATIVE Table of Value of Foreign Trade of the Austro-Hungarian Monarchy in the Sixth and Seventh Decades, in the under-mentioned Groups of Articles :—

A.—IMPORTS.

Groups.	1851 to 1860.	1861 to 1870.	The Seventh Decade shows percentage.	
			Increase.	Decrease.
Finished manufactures -	395,716,015	651,560,345	67·13	—
Manufacturers' material -	645,243,238	990,869,174	53·58	—
Half and Auxiliary Manufactures.	452,066,966	721,272,344	59·58	—
Articles of Consumption -	643,170,795	542,285,504	—	15·67
Total Imports -	2,136,197,014	2,905,987,367	36·50	—

B.—EXPORTS.

			Increase.	Decrease.
Finished manufactures -	943,942,188	1,636,744,914	73·90	—
Manufacturers' material -	949,314,840	957,320,405	0·89	—
Half and Auxiliary Manufactures.	137,958,778	373,742,404	163·60	—
Articles of Consumption -	215,571,911	543,040,095	151·60	—
Total Exports -	2,246,787,717	3,511,347,818	56·28	—

Comparisons of the total values shows *excess of export over import* in the two last decades amounting to about 717 millions of guldens silver currency, to the advantage of our economical position.

The extraordinary progress of our producing and consuming capacity apparent in Table IV., and not to be explained away, will be still more sharply contrasted if the period for comparison be extended. In the 4th

decade (1831 to 1840) the export value of finished manufactures was, in millions of guldens, 262, and in the fifth decade (1841 to 1850) it was 299. Setting out therefore from the fourth decade, and taking its *exports* as unity the *rate of increase* in the subsequent four decades appears as 1 : 1·14 : 3·16 : 1·73.

The proportions of *increase of imports* in some goods (in the fourth decade 29 and in the fifth 62 millions of guldens) on the same calculation appears as : 1 : 2·13 : 6·38 : 1·65.

The first series of numbers indicates an extraordinary increase of trading activity within the country; and the last must be regarded as an important explanation of the cause of the increase of the exportation of finished manufactures. It is undoubtedly the continual increase of competition which, under certain conditions, stimulates energy and urges on production. But the increase of the importation of finished manufactures is more than a stimulating motive, it contains the most eloquent expression of an increase of consuming capacity.

A comparison of the export value of finished manufactures, and of the import value of manufacturers' material and half manufactures in the fifth and seventh decade gives the interesting result that the value of the export of manufactured goods intended for immediate use rose from 1 to 5·47; whilst that of the import of half manufactures, and manufacturers' material only rose from 1 to 3·38. This shows that the activity of some branches of raw production and half manufacture diminished materially the participation of the foreigners in the great increase that occurred in the seventh decade in the requirements of manufacture of finished goods. To manufacturing industry, and more especially to those branches that produce finished goods, is to be attributed the principal part of the increase of the public wealth that has accrued during the last two decades.

A comparison of the four groups of articles enumerated in Table IV., repeats, with respect to "articles of consumption"—which include coffee, tea, spices, tropic fruits, grain, cattle, fish, meat, sausages, honey, cheese, butter, edible oils, vinegar, wine, bread and delicacies—the experience of several decades that provisions, as a rule, require to be drawn in part from abroad. In spite of an extraordinary concurrence of favourable circumstances this group shows in the seventh decade an excess of export of only 754,591 guldens; whilst the great provision deficit of the sixth decade rose to 427,598,844 guldens, which the excess of industrial produce had to pay for. It must, however, be repeated here, that sugar, beer, spirits and meal, as industrial produce, are not included in the group of articles of consumption. But it can hardly be disputed that the amount of 123,119,341 florins, export excess of these four articles in the seventh decade, is to be considered as one of industrial products produced by strictly manufacturing process.

To complete the representation of the goods commerce follows :—

TABLE V.

COMPARATIVE Statement of QUANTITIES of Articles of Foreign Trade in the Austro-Hungarian Monarchy at the following dates :—

A.—IMPORTS.

	1841 to 1850.	1851 to 1860.	1861 to 1870.
Finished manufactures (centners) -	1,811,293	4,487,046	14,696,918
Ships (tonnage) - - -	—	39,228	9,027
Carriages (tale) - - - -	770	4,974	2,478
Newspapers (value) - - -	2,288,500	2,140,585	2,409,896
Manufacturers' material and half manufactures (centners) - -	35,403,555	68,993,930	151,456,880
Cattle for draught (tale) - -	127,127	108,993	92,943
Timber (cubic feet) - - -	47,528,800	142,596,800	99,056,500
Articles of consumption (centners) -	38,528,470	68,959,558	45,306,173
Cattle for food (tale) - - - -	5,289,698	7,906,744	7,461,874

B.—EXPORTS.

	1841 to 1850.	1851 to 1860.	1861 to 1870.
Finished manufactures (centners) -	6,075,548	8,202,152	21,396,827
Ships (tonnage) - - -	—	929,406	1,526,495
Carriages (tale) - - - -	14,632	26,999	33,416
Newspapers (value) - - -	334,373	449,705	627,302
Manufacturers' material and half manufactures (centners - -	17,587,911	42,594,279	157,987,605
Cattle for draught (tale) - -	104,266	102,919	162,885
Timber (cubic feet) - - -	141,027,800	286,190,000	579,932,000
Articles of consumption (centners) -	23,245,552	36,937,460	130,792,434
Cattle for food (tale) - - -	3,505,060	3,647,251	6,088,575

For a full appreciation of foreign trade a consideration of the origin and destination of commodities is indispensable. Superior producing capability may for a time result in a material trade advantage gained from another territory of less developed productive energy; but, in the long run, the contest with equals is much more beneficial, in the stimulus it gives to home energy. This is easily shown by the history of Austrian industry, which receives a new impetus from its competition with the more advanced civilised states, disputing the home market with them, and fighting hard to extend its markets in foreign countries. It is unfortunate that the statistics available only enable the share in the trade movement to be determined in respect to the frontiers (Germany, Switzerland, Italy, Turkey, Russia), and free ports. All that entered or left the monarchy across these boundaries is shown in the following Tables.

TABLE VI.

COMPARATIVE Statement of the Share of the Frontier States and Free Ports in the Foreign Trade of the Austro-Hungarian Monarchy :—

1854.

Total of Imports, Fl. 203,384,348 Austrian currency.

Percentage Share of:

Frontier States and Free Ports.	Finished Manufactures.	Half and Auxiliary Manufactures.	Manufacturers' Material.	Articles of Consumption.
Zollverein - -	75·50	74·00	36·00	15·00
Russia - -	0·75	3·50	11·00	9·00
Turkey - -	0·65	3·67	12·00	28·00
Italy - -	8·60	4·75	8·00	0·75
Switzerland -	5·50	2·33	2·00	0·75
Trieste - -	2·50	8·00	16·00	14·00
Other ports -	6·50	3·75	15·00	22·50

Total of Exports, Fl. 125,221,831 Austrian currency.

Zollverein - -	41·37	72·75	27·09	48·85
Russia - -	3·57	0·84	2·06	3·45
Turkey - -	23·37	7·43	0·70	5·30
Italy - -	3·61	2·75	17·40	12·46
Switzerland -	0·23	0·46	46·44	4·37
Trieste - -	22·95	9·80	2·81	12·20
Other ports -	5·50	5·97	3·50	13·37

1857.

Total Imports, Fl. 255,045,081.

Frontier States and Free Ports.	Finished Manufactures.	Half and Auxiliary Manufactures.	Manufacturers' Material.	Articles of Consumption.
Zollverein	85·00	74·50	41·85	26·47
Russia	0·62	1·65	7·30	3·99
Turkey	0·12	1·66	11·26	18·88
Italy	4·00	7·26	11·72	9·50
Switzerland	3·01	2·75	1·87	1·70
Trieste	1·10	7·28	14·70	16·70
Other ports	6·15	4·40	11·30	22·76

Total Exports, Fl. 231,879,051.

Zollverein	34·79	47·67	45·77	42·78
Russia	5·62	4·54	3·49	2·54
Turkey	32·51	22·79	1·35	8·20
Italy	2·86	4·29	10·86	15·30
Switzerland	0·38	0·76	29·74	3·87
Trieste	20·63	15·60	2·64	16·76
Other ports	3·21	4·35	6·15	10·55

1859.

Total Imports, Fl. 196,749,300.

Zollverein	80·96	75·40	44·38	33·92
Russia	0·48	2·06	8·36	3·60
Turkey	0·16	2·12	11·27	23·85
Italy	3·05	3·49	7·98	5·22
Switzerland	1·84	2·04	1·56	0·57
Trieste	2·50	10·59	17·76	15·33
Other ports	11·01	4·30	8·77	17·50

Total Exports, Fl. 215,577,000.

Zollverein	43·20	55·95	63·25	44·36
Russia	7·97	1·60	5·01	2·59
Turkey	22·97	10·77	2·14	8·49
Italy	5·22	13·43	7·79	7·95
Switzerland	0·43	1·26	13·15	4·94
Trieste	17·15	14·63	3·90	19·39
Other ports	3·06	2·36	4·76	12·18

1863.

Total Imports, Fl. 249,357,690.

Frontier States and Free Ports.	Finished Manufactures.	Half and Auxiliary Manufacturers.	Manufacturers' Material.	Articles of Consumption.
Zollverein - -	85·00	85·96	54·81	39·73
Russia - -	0·32	0·78	7·18	1·31
Turkey - -	0·16	2·50	16·20	24·15
Italy - - -	6·65	1·69	4·03	3·56
Switzerland - -	0·63	0·64	1·59	0·49
Trieste - -	2·74	5·39	11·63	17·53
Other ports - -	4·50	3·04	4·56	13·23

Total Exports, Fl. 288,905,154.

Zollverein - -	36·81	57·91	75·79	56·74
Russia - -	6·18	2·00	5·52	3·26
Turkey - -	28·29	10·35	1·06	3·31
Italy - - -	3·96	2·46	10·54	13·70
Switzerland - -	0·20	0·49	0·27	2·75
Trieste - -	21·18	18·98	3·88	13·07
Other ports - -	3·38	7·81	2·94	7·17

1867.

Total Imports, Fl. 286,452,423.

Zollverein - -	92·85	90·59	54·74	28·40
Russia - -	0·51	0·51	4·27	4·90
Turkey - -	0·15	2·80	17·03	20·92
Italy - - -	5·75	1·47	6·88	9·70
Switzerland - -	0·47	0·48	1·48	3·14
Trieste - -	1·24	4·97	15·09	31·98
Other ports - -	0·18	0·18	0·51	0·96

Total Exports, Fl. 403,895,757.

Zollverein - -	45·30	62·12	78·88	81·28
Russia - -	6·64	2·57	4·91	1·86
Turkey - -	21·27	6·97	2·23	0·93
Italy - - -	5·84	0·37	7·10	2·50
Switzerland - -	0·19	0·20	0·46	0·96
Trieste - -	20·40	22·30	5·71	12·02
Other ports - -	0·36	5·47	0·71	0·45

1870.

Total Imports, Fl. 425,075,492.

Frontier States and Free Ports.	Finished Manufactures.	Half and Auxiliary Manufactures.	Manufacturers' Material.	Articles of Consumption.
Zollverein - -	88·88	84·79	55·92	41·80
Russia - -	0·16	0·45	3·78	7·80
Turkey - -	0·65	0·12	0·16	21·20
Italy - -	3·84	1·43	6·24	7·70
Switzerland -	0·32	0·33	1·17	0·34
Trieste - -	6·67	10·21	24·15	18·91
Other ports - -	0·17	0·58	0·18	2·25.

Total Exports, Fl. 391,377,300.

Zollverein - -	38·85	67·25	76·36	78·88
Russia - -	8·90	1·94	3·35	1·18
Turkey - -	24·22	6·46	3·38	1·60
Italy - - -	7·21	2·74	8·51	5·80
Switzerland - -	0·13	0·40	0·40	0·90
Trieste - -	20·38	19·18	7·31	10·76
Other ports - -	0·31	2·02	0·69	0·88

TABLE VII.

The extent and direction of the transit trade of the Austro-Hungarian Monarchy appear from the following statements.

The transit through the general customs territory was :—

—	Centners.	Number.	Cubic feet.	Tons.	Total value.
					Fl.
1851 to 1860 -	14,838,425	120,642	4,323,400	72,826	1,171,740,341
1861 to 1870 -	28,061,899	391,552	5,818,100	25,198	1,326,230,607

This was divided as follows :—

—	1851 to 1860.		1861 to 1870.	
	From	To	From	To
	Fl.	Fl.	Fl.	Fl.
Zollverein - -	666,119,132	61,438,229	889,004,302	141,768,744
Russia - -	30,631,692	128,057,260	41,499,220	122,021,479
Turkey - -	14,618,360	379,747,721	43,034,028	409,774,018
Italy - -	135,844,169	116,661,205	130,330,299	199,340,811
Switzerland - -	159,863,253	45,625,615	912,931	1,086,678
Trieste - -	77,461,626	226,249,334	163,788,709	377,790,977
Venice, Fiume, and other ports.	87,202,109	213,960,656	57,161,118	74,447,900

The transit amount in the seventh decade, compared with that of the sixth decade, showed an increase throughout, excepting in the articles measured by tons (ships). This increase amounts as to value to 13·21°/, as to weight to 89·15°/o; in the articles calculated by number (cattle) to 225·8°/o; and in those measured by cubic feet (timber) to 34·7°/o. The increase is plainly a result of improved means of conveyance of through traffic, of increased production, increased capability of consumption, and animation in the terminal markets of this transit trade. But of incomparably greater importance than the quantity of transit goods is the question of what they consisted, and the comparison of this transit trade with our own export of the articles passed through in transit. Dealing only with articles in which our own manufactures are most interested, we will notice some half and finished manufactures which passed in transit from the Zollverein and over the borders of Russia, Turkey, Italy, and the free port of Trieste, and bring our own exports over these borders into comparison. In the period 1861 to 1870 according to the statements of the commercial report attached to the tariff, the Zollverein sent across the Austro-Hungarian territory in transit.

	Florins.
Yarn - - - - - -	18,521,923
Hosiery and woven goods to the value of	477,336,690
Instruments, machinery, &c. - -	231,158,925
Leather, leather and furriers' goods -	33,875,340
Bone, wood, glass, stone and clay wares	16,385,325
Metal wares - - - -	26,637,370
Chemicals, colours, oils, &c. - -	8,722,227

The values of goods of these descriptions that during the same period passed in transit the frontiers of Russia, Turkey, Italy, and the free port of Trieste, are compared with the exportation of the same goods to the same places, in the following table :—

TABLE VIII.

—		Russia.	Turkey.	Italy.	Free Port of Trieste.
Yarn - - - - -	*a.*	1,538,022	8,578,229	3,586,207	2,752,141
	b.	1,459,834	2,541,106	1,990,211	1,963,498
Hosiery and woven goods -	*a.*	47,893,382	198,284,678	53,147,131	162,383,804
	b.	36,924,858	157,802,923	35,420,862	135,476,153
Instruments, machinery, &c. -	*a.*	36,724,565	100,046,690	40,489,794	47,464,356
	b.	24,010,847	91,970,888	26,503,700	56,645,517
Leather, leather and furriers' goods - - - - -	*a.*	682,433	12,869,493	6,791,855	11,961,471
	b.	1,592,059	46,353,391	3,244,017	14,114,361
Bone, wood, glass, stone and clay wares - - -	*a.*	1,109,695	4,577,159	3,282,113	6,350,813
	b.	8,053,880	38,707,432	6,844,195	26,543,515
Metal wares - - - -	*a.*	2,920,233	14,070,097	3,079,986	5,758,981
	b.	13,618,398	35,769,524	4,971,485	24,355,851
Chemicals, colours, oils, lucifer matches, &c. - - -	*a.*	520,340	3,270,090	1,649,371	2,901,609
	b.	3,162,393	17,805,039	1,681,397	14,913,365

a. Transit value of articles from the Zollverein in guldens (Austrian currency).
b. Export value of similar articles from the customs area of the Austro-Hungarian Monarchy.

M.

Development and Actual Position of Manufacturing Trade in the Countries represented in the Reichsrath.

Manufacturing industry is, after agriculture, the chief source of subsistence to the peoples of the Austrian empire, and has during the last decades greatly increased in extent, and progressed in taste and finish. The principal sites of manufacture of articles of export are in Bohemia, Moravia, Silesia, and Lower Austria, real manufacturing countries, in which the activity of trade is favoured by plentiful capital, excellent means of communication, and abundance of fuel, and developed in almost every ramification. Next in rank come Vorarlberg, Styria, and Upper Austria; and, in the third place, the Tyrol, Salzberg, Carinthia, Krain, and the coast country; the least in importance being Galicia, and then the Bukowina and Dalmatia.

The last census, of 31st December 1869, gave the number of persons employed in trade manufacture, without reckoning dependent members of families, owners of smelting works and their labourers, in the countries represented in the Reichsrath at 11·1 per cent. of the entire (civil and military) population. In the countries of the Hungarian kingdom the proportion, at the same date, was 4·2 per cent.; and for the whole of the Austro-Hungarian monarchy 8·1 per cent. of the whole population.

1. MANUFACTURE OF MACHINERY, MEANS OF TRANSPORT AND TOOLS. THE ACTUAL POSITION OF THE VARIOUS BRANCHES OF INDUSTRY.

Machinery.—Although this manufacture has to contend in Austria with an organised and far-advanced foreign competition, and with many impediments unknown to other countries, such as dearness of fuel and of iron, defective education of artisans, &c., it shows in comparison with former years remarkable progress, especially in the construction of railway plant and fixed engines, in contrivances for the use of brewers, distillers, sugar bakers, and millers, and its works in precise mechanics can be favourably compared for finish and elegance of design with foreign productions.

The principal centres of machinery manufacture are Vienna and Lower Austria, the especial productions of which are locomotives, tools, sewing machines, agricultural machinery and fire engines. Prague is noted for steam engines, and the erection of sugar manufactories, beer breweries, mills, and other industrial establishments; Reichenberg and Brunn for erecting factories for spinning and weaving, the latter also for steam engines, boilers, and mining machinery; and, finally, Trieste for marine engines.

Manufacture of Means of Conveyance.—Agricultural carriages, carts, waggons, sledges, &c. are mostly built by retail traders, and partly by the landowners themselves. The building of coaches and other passenger-carriages is of a high order in Austria, so perfect as to leave little room for improvement. In Vienna especially carriages of luxury are built which are greatly sought after for this country, as well as for Russia, Turkey, and the Danubian Principalities. This industry is also very actively pursued in Prague. Caleches of the ordinary kind are constructed principally in Moravia and the Bukowina. Railway carriages are built on a wholesale scale. The extension of the network of railways has rendered this industry highly important during recent years. The most important establishments are in Vienna and Prague, or in the immediate neighbourhood of these towns. The monarchy is also well known abroad for the quality of the ships built here. Large docks are constructed in Trieste and Pola for building sea-going vessels, and in Linz and Prague for vessels employed in river navigation.

Manufacture of Instruments.—The manufacture of scientific instruments, as mathematical, physical, surgical, optical, and astronomical, has recently improved in Austria to an extraordinary degree. It has not only achieved almost complete independence of foreign supply, but exports various kinds of instruments. The principal places for this branch of manufacture are Vienna and Prague, the first especially for mathematical instruments, thermometers and barometers, telegraphic apparatus, surgical instruments and appliances, and all kinds of scales. Austria occupies an honourable position also in the manufacture of musical instruments, especially of wind instruments, for which large factories exist at Vienna, Prague, and Koniggraetz, far surpassing all other countries, with the sole exception of France. Retail makers also of these instruments exist at Grasslitz and Schoenbach in the Erz mountains. The manufacture of stringed instruments and organs is steadily increasing; that of pianofortes, especially in Vienna, has reached a high position, producing an important article of export. The Vienna pianos are distinguished for accurate finish, beauty of tone, and cheapness, and are much liked abroad. During the German-French war the foreign demand exceeded the ability of producers to satisfy it, the home and Hungarian demand taking the whole supply. Specialities of Austrian manufacture are harmonicas in Vienna and Jews' harps at Steyr. Clockmaking is principally directed to the manufacture of pedestal, pendulum, and church turret clocks; that of watches is insignificant, they are imported, and our watchmakers only repair them.

For the above-mentioned branches of manufacture, including the mechanics' workshops attached to railways, iron works, and other manufacturing establishments, the Austrian half-empire contains 17,991 factories, of which—

Motive-power machinery, tools, and parts of engines occupy	785
Means of conveyance	13,239
Mathematical, physical, optical, surgical, and musical instruments	3,967
Together	17,991

2. Metals and Metallic Wares.

Iron.—This is a prominent branch of Austrian industry, for which the supply of raw material is abundant. The produce of iron ore of the countries represented in the Reichsrath amounted—

In 1867 to 10,623,289 customs centners.
„ 1868 „ 12,097,870 „
„ 1869 „ 13,761,064 „
„ 1870 „ 16,703,016 „
„ 1871 „ 17,279,303 „

The increase in this period was thus 62·65 per cent.

Iron ore is found in all provinces but those of the sea coast, especially in Styria and Carinthia, Bohemia, Moravia, and Silesia. The produce is small in proportion to the immense wealth that exists. In 1871 the number of smelting works (blast furnaces) was 179, of which 47 were standing cold; of labourers employed 12,278, of whom 11,348 were men; the produce in that year of fined iron 5,005,471 centners, and of cast iron 828,833 centners.

The following table exhibits the productions of raw iron of previous years :—

Year.	Number of Blast Furnaces.	Labourers.	Zoll centners.
1867	181	—	4,297,107
1868	180	—	5,252,042
1869	179	11,433	5,561,410
1870	171	11,636	5,571,409
1871	179	12,278	5,834,304

Hungary produced in 1867, 2,100,951 centners, and in 1871, 2,658,008 centners.

In spite of the annual increase in the produce of raw iron, it did not satisfy the demand, but imports were made from abroad in considerable quantities. Cast-iron goods are constructed either in separate foundries or as a department in machinery factories and iron works. The former are mostly situated in the large towns and their neighbourhood, and near large manufacturing establishments which require cast-iron goods, chiefly parts of machinery.

A considerable manufacture of bar iron (bloom iron) is still carried on in Austria in the old refining furnaces, but is much competed with by the new process of refining in reverberatory furnaces (puddling), which was first introduced in 1830 at Witkowitz. The most important areas of production are the Upper Wiener-wald in Lower Austria, Weyer in Upper Austria, Upper and Lower Styria, Carinthia, Pilsen, Beraun, Horowitz and the neighbouring parts of Bohemia, the north of Moravia, especially Witkowitz, Zoeptan, Blansko, &c., and Silesia.

The production of bloom iron in 1870 was, of merchant iron 1,441,797 centners; and of bar, rod, and fined iron 2,683,784 centners.

The production of steel in consequence of the abundance of iron ore, and the quantity has long been very considerable, changed and increased as it has

been recently, by the introduction of the Bessemer process. Of the older kinds of steel rough steel is produced in considerable quantities by charcoal, but the increased prices of charcoal and wages and the increased demand for other sorts of steel have reduced the production of rough steel, which is carried on principally in Upper Styria and Upper Austria. Another sort of steel, which is of inferior quality to well bloomed rough steel, but much used for tires of wheels, is puddle steel. This is for the most part manufactured in large rolling mills, in Zwischerbrucken (Lower Austria), Reichraming (Upper Austria), Zeltweg, Eibiswald, and Pichling (Styria), Streiteben (Styria), Stefanan (Moravia), and Karlshuette near Friedeck in Silesia. The above kinds of steel and cemented steel, which is mostly made in Styria, are frequently by a further refining made into shear steel and cast steel; the former in Carinthia and Krain and other provinces, the last in Upper Styria, Lower Austria, &c.

The introduction of the Bessemer process marks a material improvement in the iron industry of Austria, it happened in 1863, when the first Bessemer works were erected at Turrach in Upper Styria. Since that date seven more establishments for the Bessemer process have been added, which produced in 1872 a quantity of 1,356,656 zoll centners as against 6,115 in the first year of introduction of the process in 1864.

The manufacture of Martin steal was begun at Gratz in 1870. In 1872 the three smelting works at Gratz, Floridsdorf, and Neuberg produced 194,903 centners; but Floridsdorf, which produced the bulk of this quantity, has since been disused.

Sheet metal with the increase of railroad, traffic, and shipping, and the extensive building operations carried on, has been manufactured of late in largely increased quantity. Most of the iron plate, hammered or (more generally) rolled, comes into commerce as black iron plate. The largest and strongest plates are for boilers and shipbuilding, and the production of these has increased of recent years in a particularly striking degree, that of tin-plate and galvanised iron in less, while that of steel plates, &c., seems limited to Upper Styria. The iron plate manufacture of Austria delivered the following quantities, in the year 1870 :—

Black iron plate	353,471	Zoll Centners.
Boiler plates, shipbuilding plates	352,192	,,
Tin-plate and galvanised	58,823	,,
Steel plate, &c.	6,077	,,

The greatest part of this produce, which was not enough for the steadily increasing demand, came from Styria; and in the second rank, Bohemia and Lower Austria.

The manufacture of iron wire has had to meet a steadily increasing demand of recent years, for making screws, rivets, nails and iron pins, wire ropes and telegraph wires. Foreign produce has necessarily been imported for these purposes, especially for the finer sorts of wire. The chief producing countries are Lower Austria, then Styria and Carinthia.

The manufacture of rails and tires of wheels and similar railway material has been very active in consequence of the construction of many new lines of rail, of which there were opened to traffic in 1870, 206·42 miles, in 1871 286·81, and in 1872 278·99 miles.*

In spite of the erection of new iron works for this manufacture and the extension of those existing, the demand could not be satisfied without importation. In 1870 the manufacture of rails amounted to 2,105,459 centners, but has since that date materially increased.

Manufactured goods of iron and steel, in which remarkable extension is noticeable of recent years, include agricultural implements, parts of tools and similar iron goods mostly made by retail dealers, &c. *Locksmiths' goods* have been manufactured in increased quantities of late for the building carried on in Vienna and its neighbourhood. *Iron wire* manufactures, among which wire rope has recently been introduced, occupy two independent establishments in Carinthia and Lower Austria. *Fire proof safes* manufactured wholesale since 1853, are a speciality of Vienna. Eight large or

* The Austrian mile is 4·7142 miles English.—*Translator.*

establishments carry on this manufacture, seven in Vienna, and one at Gratz, most of the produce is for export to the east. *Iron furniture*, exclusively a Vienna article, steadily increasing in importance, occupies four large establishments. *Carriage axles and springs* are made in considerable quantities, especially in Styria, the former also in Lower Austria and the latter in Carinthia. Three large manufactories of locomotive axles exist in Moravia, Silesia and Lower Austria respectively. The manufacture of *cooking and other utensils* of cast iron and plate forms a new industry continually extending. It occupies amongst others four large establishments in Lower Austria, five in Bohemia, three in Moravia, one in Silesia, and one in Galicia. *Spoons* are made principally at two large establishments at Eger and from small retail industry. *Files*, much pressed by competition of the cheap English and Rhine manufactures, have recently taken a higher position with increased demand and progress of the home production. *Wire sieves* are made in Lower Austria. *Needles*, for the most part imported from England and Rhenish Prussia, and impeded by the dearness of raw material. This manufacture has a difficult position to maintain; it occupies two large establishments at Hainburg on the Danube, and Fugen in Tyrol, and a small retail industry in Lower Austria, in Eger province and in Karlsbad. *Nails, wire pins, screws* and *rivets*, a materially increasing industry. Screws and rivets chiefly in Lower Austria in 14 large establishments. Other articles mostly by retail makers in all provinces, especially Carinthia, Bohemia and Upper Austria, also 14 establishments in Moravia, Silesia, Bohemia, Carinthia, &c. *Steel pens* for lack of raw material very small. One large manufactory exists in Vienna. *Farriers* and *spur makers'* goods, a limited retail industry most extensive in Vienna. *Parts of umbrellas* and *parasols*, *gas* and *water conduits*, both at Vienna. *Fire arms*, civil and military, besides the Imperial Royal Arsenal at Vienna there is now only one private factory in Lower Austria, formerly there were ten. The manufacture of military arms is now almost entirely in the hands of a joint stock company, which produced in 1870, 148,950 guns and 100 mitrailleuses, of the value of 4,070,000 florins. Weapons for hunting or ornament are made by small retail makers, mostly established at Ferlach and Weipert. At Vienna and Prague, however, there are some more important establishments, the trade elsewhere is confined to repairs. Artillery is made exclusively in the Imperial Royal Arsenal at Vienna. Side-arms, as swords, bayonets, deer stalking knives and sheaths occupy three large establishments in Lower Austria. *Scythes* form one of the most ancient and celebrated branches of manufacture in the Alpine provinces of Austria. Excellence of the raw material, steel, and conscientious workmanship raised the scythe manufacture to importance, and thousands of men are now employed by it. But it has undergone great changes in modern times, having many difficulties to contend with, such as dearness of raw material and labour, &c. A fourth part of the works have in consequence been discontinued, many others now use, instead of shear steel, cheaper sorts as Bessemer or cast or even puddle steel. The production in 1870 exceeded six millions of scythes besides one million sickles and about 200,000 straw-knives. The principal producing province is Styria, after which come Upper Austria, Lower Austria, &c.

Other Metal Industries.

The centre of the production of *lead* is in Carinthia, where lead ore is won in considerable quantities at Bleiberg, Raibl, and Bleiburg; next comes Bohemia, and for smaller quantities the Tyrol, Styria, and Krain. The produce of lead is far too small for the demand of the many forms of its consumption in manufacture, and in 1871 the Austrian production being 68,803 centners, and that of Hungary 32,150 centners, the imports from foreign countries were 74,003 centners.

Copper is won in fairly considerable quantity in Austria-Hungary. The produce of raw copper from ore amounted in 1871 to 33,428 centners, of which 7,935 centners fell to the western provinces.

Zinc. The produce of the countries represented in the Reichsrath amounted in 1871 to 35,637 centners, and is important in Western Galicia and Krain; but Hungary yielding only 8,000 to 9,000 centners, far greater quantities are imported from abroad.

For *tin*, Austria is almost entirely dependent on importation from abroad. The home production, at Schlaggenwald and Zinnwald in Bohemia, does not exceed 773 zoll-centners (1871).

The production of *arsenic*, confined to the works at Rothguelden, Salzburg, has remarkably diminished in the last five years. It amounted in 1867 to 3,212 zoll centners, but in 1871 to only 943.

Nickel and *cobalt speiss* are also produced in very small quantities at Salzburg (100 to 120 zoll centners).

Leaf gold, silver leaf, and *party gold*, in spite of active foreign competition from Nuernberg, and the common use of imitation gold for the frames of mirrors and pictures, is a fairly prosperous industry at Vienna and Prague. Vienna has five large establishments for this manufacture. *Gold* and *silver wire* are also largely manufactured at Vienna. Coarse wire received from the assay office is the raw material, of which 1,028,026 lbs. were manufactured in 1871, and 1,128,374 lbs. in 1872 (Mint weight). Manufacturers of gold, silver, and jewellery are made in considerable quantity in Austria, and in very tasteful style. The centre of this production is the capital, Vienna, whose work includes all objects of jewellery, from the finest and most delicate articles to the heaviest massive pieces, and is celebrated far beyond the boundaries of the empire; and Prague, whose speciality is the carbuncle; also Lemberg, Bregenz, and, in a less degree, some other towns. The amount of gold and silver manufactures submitted to assay in 1872 was 83,920,603 lbs. There is a large establishment in Vienna for the use in manufacture of gold and silver dross. The Austrian *quicksilver* production is confined to the celebrated works at Idria in Krain, and has considerably increased of late. It amounted in 1867 to 5,437 centners of the value of 592,475 florins, and in 1871 to 7,515 centners of the value of 1,225,490 florins.

Brass and *tombac* (red brass) and goods of this material are chiefly produced in Lower Austria, where eight establishments are fully occupied in the manufacture of brass and tombac plates and wire, brass pipes, cartridges, and various household utensils. Other large establishments manufacture these goods in other crown lands, two in Styria, and one each in Upper Austria, Tyrol, and Salzburg. Of particular importance is the demand of metal plate for cartridge ends, which the home manufacture has hitherto scarcely sufficed to supply. *Japanned sheetware*, principally cups, is manufactured by one important establishment at Vienna for home consumption and export. Other *brazier's work*, as building work, house and kitchen utensils, bath requisites, lanthorns, &c., are made by small retail makers in large towns, more extensively also in Vienna and Prague. For *metal castings* there are six large factories in Vienna, three in Bohemia, and 13 smaller in Prague. *Bronze* manufacture, introduced from France to Vienna at the commencement of the century, has become very important. It is intimately allied with art, and its taste and execution of original design give it the significance of a branch of art industry. It is only carried on in Vienna, where 12 large establishments and a number of smaller ones manufacture chandeliers, branched candlesticks, table trays, writing implements, and other similar articles. *Pak-fong* and *electro-plated ware* are also made in Vienna, and in one large establishment in Lower Austria. *Plated goods* employ two large establishments and 30 platers in Lower Austria, principally Vienna. The former produce harness ornaments of silvered composition, the latter German silver carriage ornaments. *Cartridge sockets* have been manufactured recently by private enterprise; in Lower Austria there are four manufacturers. *Metal coffins* are an important manufacture in Vienna, for home use and for export. The same may be said of *metal buttons*, principally gilt and silvered, whith are made in Vienna, and in important quantity in Northern Bohemia. *Scales and weights* employ four large factories in Vienna. *Pipe and walking stick ornaments* are produced in the neighbourhood of Vienna. *Electro-metallurgy* employs, besides the government printing office which, prepares copper plates for bank notes and bonds and stereotype, one other establishment in Vienna in the reproduction of works of art and ecclesiastical objects. Finally several establishments in Vienna belong to this class who make match boxes, coins, leaf metal, and aluminium for home consumption and for export.

3. Manufacture of Non-metallic Minerals.

Earthenware industry.—The last decades have produced striking results in ceramic manufacture, in quantity and in quality. Brickmaking has long been a wholesale manufacture, and has attained colossal dimensions, especially in Vienna. In 1841 the number of bricks of all sorts made at or near Vienna was 110 millions; in 1856 it was 124 millions; in 1870 it exceeded 250 millions. Similar favourable statistics could be collected from other places; large and well arranged establishments are competing with the smaller. The use of brick moulds, and the recent introduction of the Hoffman Licht Kiln, are the most important points of technical progress, providing a substitute for expensive labour and an important economy of fuel, and the great advantage of uninterrupted continuance of labour. Extensive building, and increasing demand for ornament, gave increased importance to the production of comparatively cheaper, more durable, and more pleasing architectural ornaments and figures, and the terra-cotta manufacture was thus increasingly developed year by year. Starting from Vienna, where it is still most considerable, it has become active in Bohemia, Silesia, and Salzburg, and here and there in other provinces. The manufacture of *siderolite* goods has its centre on the Lower Elbe, and is worked most for export, being free from any foreign competition. The vessels, formerly simple, have now, by artistic decoration, been improved to articles of luxury, and are especially remarkable for imitations of antique earthen and bronze vessels. *Common coarse pottery* is now superseded by stoneware and porcelain, and by the general use of iron pots. *Stoves of Dutch tiles*, an industry formerly in the potter's hands, has recently been taken up by large factories, and much improved. There are large establishments for this manufacture in Vienna, Prague, Gratz, and other places. Besides the above named a considerable variety of other earthenware manufactures are made. *Stoneware* is much used for pipes, chimney pots, ventilators, and chemical apparatus. Originally a dependent branch of other manufactures this has of recent years assumed unexpected dimensions. The most important factories are in Lower Austria, Bohemia, and Moravia, situated nearest to the best markets. Stone bottles for mineral waters are made in Bohemia. Pottery occasionally takes the character of stoneware, but vessels or tiles of the finest sort are not made, and all attempts to create such an industry have hitherto been unsuccessful. *Fireproof bricks, muffles, glass pots*, and other produce of this kind are produced in large quantity in Lower Austria and Bohemia, and to some extent in almost all the other countries of the empire.

Crockery is made in Bohemia, Moravia, Galicia, Styria, and Lower Austria. Machinery is used for modelling on the English method, from which also the process of printing under the glazing is adopted. White or printed or painted vessels are produced according to quality, and generally for use. In Moravia a glazing is applied free from lead, and of late faience paintings have been introduced on jugs and dinner services. Galicia and Hungary purchase these goods, and considerable quantities are exported to Roumania, Turkey, and indirectly to America. In 1856 there were 13 porcelain manufactories in Austria, nine of them in the neighbourhood of Carlsbad. There are now 18, all in Bohemia, and 14 of these about Carlsbad, a neighbourhood peculiarly adapted to this manufacture. With small exception the whole manufacture is of articles for use, only one establishment producing the very finest ware. Machine turning has been introduced in some establishments, mixing machines on an improved system erected, kilns reconstructed, and above all the expensive fuel of wood replaced by brown coal, the muffle furnace only being now heated with wood. Gas heating was successfully introduced in one establishment, but not elsewhere. The principle of the division of labour has finally been applied to the style of produce, and energy is devoted to the wholesale production of middle class ware. Although our home manufacture may show less independence of invention than that of other states it has the great merit of conscientious finish. It provides the home market and a considerable export. Only articles of luxury and the very finest sorts are now imported.

Clay pipes are made in Bohemia and Lower Austria.

Majolica ware is almost entirely neglected. It is only in Moravia that some is made. Of recent years majolica painting has been applied with great success to architectural ornaments. We would mention especially the medallions and ornaments of the Wienerberg brick-making company.

Other Industries dealing with Stone and Earth.

All productive industry applied to architectural purposes has equally increased in extent with brick-making. *Stone cutters' work* has no new method to show, but in quantity and quality has made great advance. This remark applies, from obvious reasons, to the large towns and their neighbourhood. The manufacture of *mortar* is in many places carried on in large establishments. Vienna and Prague are the principal places where the production in quantity and technical process is most developed. Artificial *cements*, until recently almost all derived from abroad, are now produced in considerable quantities, and of a quality that rivals or surpasses the best of foreign produce. The production is principally in the Alpine provinces, in Lower Austria, Salzburg and the Tyrol, where a calcareous marl of peculiarly suitable formation supplies excellent raw material. There are also works in Bohemia and on the coast in which the materials are composed of various mineral substances. *Fancy goods of marble* are made in Salzburg in large quantity. *Porcelain clay* in Bohemia, especially about Carlsbad and Pilsen, is not only used for the manufactories of porcelain, stone ware, and other earthenware goods, but is also supplied in large quantities to manufactories of *ultramarine* at home and abroad. Similar progress has been made in the production and manufacture of other mineral substances, such as barytes, fibrous gypsum, yellow ochre, and others.

4. Chemical Manufactures.

The industry in the manufacture of chemicals directly based on the production of sulphuric acid, produces Glauber's salt, muriatic acid, soda and caustic soda, chloride of lime, &c., and is pursued extensively in Bohemia, Silesia, and Lower Austria. The *sulphuric acid* manufacture supplies a considerable export. *Soda*, on the other hand, is in still larger quantities imported; but *nitric acid* again is largely exported. *Hydrochloric acid*, which had been rendered almost worthless a short time ago by the important production of Glauber's salt, is now profitably applied in the factories that produce it in the preparation of chloride of lime, for which an increasing demand is made for making paper and for bleaching, and is also consumed in no small quantities in the numerous sugar manufactories. *Fuming sulphuric acid* is now only produced in Bohemia. The use is daily decreasing but the supply still increases. *Alum* is mostly produced in Bohemia and Moravia from alum slates; *vitriol of iron and copper* also there, and more abundantly in Lower Austria. *Chromate of potash* is prepared in Styria and Lower Austria; other preparations of chrome ore, principally dyes, in Bohemia. *Prussiate of potash* comes from Bohemia and Moravia; *mercurial preparations* from Bohemia.

Amongst *mineral colours* are:—*Ultramarine* of excellent quality from Lower Austria and Bohemia, and *white lead* from Carinthia, Styria, and Saltzburg, which has long been celebrated; *zinc white* is made in Moravia; *Schweinfort green* in most of the factories of colour in Austria; and its latest rival, *chrome green*, in Bohemia and Lower Austria.

The production of *vegetable colours* is limited to the extraction of wood dyes, Orseille (Archil), and similar preparations. The aniline colour manufacture is nowhere represented in Austria.

Stearine, tallow candles, and soap are made everywhere, but in large quantities in Bohemia, Lower Austria, and Styria. *Petroleum* is won in Galicia and the Bukowina by purification of raw naphtha flowing from bore-holes and shafts in mines; but this branch of industry, local circumstances being unfavourable to it, has a hard fight to maintain with imported American and other petroleums. *Gas* is made in all manufacturing places and other large towns and privately by some isolated factories. It is produced from wood and from coal, and more recently from petroleum also. A good part of the coal used for gas-making is foreign, from England or Prussia. Attention has recently been directed to the utilisation of the refuse from gas-making as

ammonium water, tar, &c., and several salts of ammonia are made in Bohemia and Lower Austria.

The long famous Austrian *lucifer match* manufacture, carried on almost everywhere, but chiefly domiciled in Bohemia and Lower Austria has exported less of late years, its products being superseded in many parts of Europe by Swedish and German goods, which are favoured by cheaper freight and other local conditions. *Pharmaceutical* preparations are made in Bohemia and Lower Austria, but also largely imported from abroad, especially of a number of substances not produced in the monarchy. *Artificial mineral waters* have one factory in Salzburg. Soda-water, lemonades, &c., are made in most parts. The business of filling and despatching *natural mineral waters* increases from year to year, and the extraction of salts from mineral springs has been recently introduced. A number of factories in Bohemia manufacture starch. *Spodium and superphosphates* are produced in nearly every country to meet the large demand for sugar factories and agriculture, but superphosphates as well as potassic salts are imported. The manufacture of potash has decreased under the pressure of Russian competition and (of late years) the German artificial potashes. Hopes entertained of the Galician deposits of potassic salts were not justified by the event, and extraordinary resources of capital and skill would have been requisite to make Austria independent of foreign supplies in this important article. The manufacture of *wood charcoal* was depressed by the introduction of blast furnaces for coke; but the number of establishments producing *pyroligneous acid*, and *spirit*, &c., has considerably increased, especially in Bohemia. In connexion with these is the production of *pitch*, *turpentine*, and *lubricating oils* from native and foreign (American) resins; the latter also as a branch of petroleum and parffine production. Establishments are thus occupied in Bohemia, Moravia, Galicia, Lower Austria, &c. *Albumen* of excellent quality is produced in Bohemian, Moravian, and Galician factories. *Varnishes, sealing-wax, ink*, &c., are made in almost every important place.

The chemical industry of Austria is below the rank of that of other states, especially Germany. But it must be considered that it is one of the most recently introduced branches of manufacture, and has to contend with great difficulties in respect to the first raw material, common salt and with very unfavourable general conditions, as price of fuel and freight, finally, with a deficiency of intelligent labour; and the progress it has nevertheless made during the last two decades will be appreciated in its true importance and value.

5. Food Producing Industry.

For the production of *meal* there are in Austria about 27,000 mills, containing more than 280 steam engines of about 6,700 horse power. The number of steam and machinery mills steadily increases, but that of the smaller sort of water and wind mills, in consequence of the concentration of the trade in large establishments and the gradual diminution of water-power, is continually diminishing. *Beet-root sugar* manufacture has greatly increased in recent years. Of 225 beet-root sugar manufactories existing in Austria in 1871-2, 157 were in Bohemia, 47 in Moravia, 10 in Silesia, 6 in Lower Austria, and 5 in Galicia; at the same date there were 26 in Hungary. The following table gives a view of the movement in the position and consumed material of the sugar manufactories of the Austrian-Hungarian monarchy during the period from 1850 to 1872.

Year.	Number of Factories		Centners of Beet-root worked	
	In Austria-Hungary.	In the Countries represented in the Reichsrath.	In Austria-Hungary.	In the Countries represented in the Reichsrath.
1850–1 -	100	—	4,905,677	—
1851–2 -	106	—	5,771,794	—
1852–3 -	119	—	5,171,919	—
1853–4 -	123	—	6,129,788	—

Year.	Number of Factories		Centners of Beet-root worked	
	In Austria-Hungary.	In the Countries represented in the Reichsrath.	In Austria-Hungary.	In the Countries represented in the Reichsrath.
1854–5 -	121	—	6,469,142	—
1855–6 -	131	—	7,875,191	—
1856–7 -	120	—	9,629,912	—
1857–8 -	116	—	12,697,259	—
1858–9 -	128	—	17,018,279	—
1859–60	124	—	14,989,400	—
1860–1 -	125	—	14,317,890	—
1861–2 -	130	—	15,061,438	—
1862–3 -	139	—	17,818,376	—
1863–4 -	136	—	15,927,913	—
1864–5 -	144	—	19,856,121	—
1865–6 -	140	—	16,589,158	—
1866–7 -	139	121	20,385,757	18,206,088
1867–8 -	151	130	17,913,451	15,297,260
1868–9 -	162	140	14,113,403	12,082,536
1869–70	181	155	21,895,632	19,786,286
1870–1 -	215	190	28,416,308	24,802,398
1871–2 -	251	225	24,291,475	21,443,435

In the whole period of 22 years, therefore, the number of beet-root sugar manufactories has increased 151 per cent., and the quantity of raw material worked 395 per cent. When the beet-root crop is sufficient the Austrian manufacture of sugar not only covers home consumption but supplies a considerable quantity for export.

The production of *chicory*, *fig coffee*, and other substitutes for coffee employs in Austria 90 traders, of whom 33 are wholesale. The whole value produced is about 4,200,000 florins. *Chocolate* and *confectionery* are principally made in Vienna and in Northern Bohemia.

Manufacture of Beverages.—The production of beer has reached a high position in the Austrian Empire, and the untiring energy of the brewers in Lower Austria (Vienna and its neighbourhood) and in Bohemia has produced a beverage inferior to none of other countries. The following table shows the number of breweries, and the quantity of beer produced in the years from 1861 to 1872.

Year.	Number of Breweries.	Austrian Eimers of Beer.*
1861 - -	2,754	10,258,034
1862 - -	2,733	12,432,818
1863 - -	2,733	12,834,818
1863–4 - -	2,716	13,027,686
1864–5 - -	2,707	12,888,696
1865–6 - -	2,666	12,621,826
1866–7 - -	2,585	12,111,675
1867–8 - -	2,518	12,881,847
1868–9 - -	2,471	13,984,132
1869–70 - -	2,420	15,480,474
1870–1 - -	2,390	16,685,491
1871–2 - -	2,337	19,043,766

* The Austrian beer eimer is equal to 13½ imperial gallons, English

Although the breweries have decreased in number 15 °/₀ t[redacted] has not diminished; the breweries discontinued are the smal[redacted] establishments, which cannot compete with the large brewers. Wit[redacted] tion of a slight fluctuation from 1864 to 1867 the increase of the [redacted] of beer brewed has been constant, and for the whole period amo[redacted] 85·6 per cent. *Distillation of spirits* is an extensive industry mostly [redacted] ducted as one part of agricultural operations. The number of distille[redacted] in 1860 (ex. Dalmatia) was 27,831, and in 1871–72, 44,047, showing [redacted] increase of 58°/₀. Of the last number 1,220 were large, and mostly in Galicia, the Bukowina, Moravia, and Silesia, the remaining 42,827 were insignificant and mostly in the Alpine provinces. *Rosoglio* and *liqueurs* are made in large quantities in Dalmatia, Moravia, Bohemia, and Lower Austria; effervescing wines on a large scale in Lower Austria and Styria. The production of *mead* is of some importance in Galicia, that of *vinegar* exists in all the provinces and is mostly in the hands of small traders.

Tobacco manufactures.—The number of aerarian (Government monopoly) manufactories of tobacco and cigars has considerably increased in the last years. There were in 1868, 15 manufactories, in 1869 15, in 1870 17, in 1871 18, and in 1872 26. In the Hungarian provinces, in 1868 7, 1869 8, 1870 9, 1871 9, and 1872 10. The number of labourers employed (in Austria) in 1868, was 15,418, in 1869 16,214, in 1870 17,657, in 1871 20,156, and in 1872 26,315.

Raw material and amount of manufactured produce are shown by the following table :—*

Year.	Leaf Tobacco used.	Cigars and Cigarettes made.	Manufactured Tobacco.
	Centners.		Centners.
1868 - -	548,314	717,366,680	435,011
1869 - -	584,602	735,397,410	464,572
1870 - -	589,466	758,182,975	473,588
1871 - -	618,914	856,752,500	491,374
1872 - -	678,966	1,058,770,650	519,552

6. Textile Manufactures.

Cotton manufacture.—The manufacture of cotton goods, one of the youngest branches of Austrian industry, in spite of many unfavourable conditions that impeded its introduction into Austria, and the competition of the far advanced English manufacture, had up to the beginning of the last decade reached a comparatively high position, when, on a sudden, the American cotton crisis intervened, disastrously disturbing its development. The majority of our establishments were closed; the production sank to a small percentage of its former dimensions and the factories that continued active only did so for the sake of the labouring population they employed.

* The Hungarian tobacco manufacture in 1872 employed 10,666 workmen, and produced in the quinquennium 1868 to 1872 the following : —

Year.	Cigars.	Manufactured Tobacco.
		Centners.
1868 - - -	233,723,402	178,496
1869 - - -	267,420,963	195,440
1870 - - -	370,724,606	230,185
1871 - - -	461,635,000	214,728
1872 - - -	529,334,000	225,703

The condition of Austrian cotton manufacture remained very bad, even after the close of the catastrophe; and its complete recovery was, up to 1870, impossible. In the second half of the year 1870 a revolution came over Austrian cotton manufacture. In consequence of the German-French war prices of cotton sank rapidly, and considerably below their former standard, foreign competition even after the end of the war was in great part idle, our factories were again fully employed, and the year 1871 was once more prosperous; more so than any since the commencement of the American civil war.

The tables specially prepared for illustrating the imports of raw material are a safe guide in respect to the progress of *cotton spinning*. We subjoin, for comparison, statements of the condition of cotton spinning in the years 1841 and 1870.

1841.

	No. of Spinneries.	No. of Spindles.	No. of Workers.	Vienna centners* of Cotton Manufactured.
Austrian Monarchy -	145	899,868	18,242	178,294
Of which				
Lower Austria - -	40	371,950	7,493	85,579
Tyrol and Vorarlberg -	17	132,720	2,272	25,048
Bohemia - -	81	356,546	7,524	55,155

1870.

Austrian Monarchy -	134†	1,404,651	20,454	513,792
Of which				
Lower Austria - -	29†	409,154	6,679	157,565
Tyrol and Vorarlberg -	24	245,434	2,949	75,712
Bohemia - - -	67	614,491	8,765	218,218

The number of spinneries has diminished during the 30 years by 7·6 per cent.; but the number of spindles has *increased* by 56 per cent.; the artisans employed only by 12%, but the produce by 188 per cent. Comparison of the returns of separate provinces yields still more remarkable results, for which reason we have specified them. These data establish beyond dispute the fact of the increase of establishments, and the improvement of the machinery. It remains to be added that the produce is mostly coarse yarn, and the principal sites of this industry are the Lower Wiener Wald, and the Reichenberg districts and Vorarlberg. In *cotton weaving* we see hand looms still engaged in a hopeless contest with machinery. Power looms have been introduced since 1850, to the number of about 20,000, mostly in Bohemia, then in the Tyrol and Vorarlberg, Lower Austria, Moravia and Silesia; they are also scattered over other provinces. Their principal product is calico for printing and for use as linen; they also make fustian, stout East-Indian cotton stuff, shirtings, piqué and croisé; some establishments have recently successfully introduced pattern weaving. Hand-loom weaving is a house industry in Austria for local consumption, and is done in great part on contract. Its centre is in Bohemia, especially the north, in Moravia and Silesia, Austria below and above the Enns and Vorarlberg. It is confined to simple textures, and fancy weaving, the only province in which it has a chance of competing with machinery is entirely neglected.

* The Vienna centner = 123 lbs. 7 oz. 5 dms. English.
The Tariff (Zoll) centner = 110 „ 3 „ 10 „ „
† In 1871 the number of spinneries in Lower Austria was 33 with 468,045 spindles at work; and in all Austria 138 with 1,463,542 spindles.

The gross produce of cotton goods in Austria amounts to about six million pieces (averaging 40 ells), and represents a value of 60 million guldens. In 1841 it was $4\frac{3}{4}$ million pieces of the value of 20 million florins.

Cotton printing has reached a very respectable position in Austria, and the quality of the goods approximates to the English cheap sorts produced in large quantities, but the so-called *haute nouveautés* are not attempted. The small retail printers work on contract, but the large establishments buy raw material for their own account, and prepare it for the market. The first printing establishments were founded in the Dukedom of Austria under the Enns in the middle of last century, but they were nearly all abandoned in the first half of this century: the only important factory now remaining is that at Neunkirchen. The first in Bohemia was erected in 1763 at Burgstein. At Josephsthal and Prague, where this manufacture now takes the leading rank, it was introduced at a much later date, the numerous other factories in the Bohemian mountains have for the most part been abandoned, except Aicha and Warnsdorf, where calico printing is still carried on to a fair extent. This industry is also connected with the cotton factories in Vorarlberg. The value of annual produce amounts to about 25 to 30 millions of florins.

Cotton dyeing, bleaching, and *finishing* is centred in Lower Austria, Vorarlberg, Bohemia and Moravia. Special establishments for dyeing yarn, especially Turkish red, exist in Vorarlberg, Bohemia, Moravia, Silesia, and the coast provinces. The use of aniline dyes has during the last decade and a half grown to considerable importance, and quite recently artificial alizari has been brought into use.

Woollen Manufacture.—The manufacture of spun and woven goods from carding wool occupies a respectable position in Austria, employs a very large amount of labour and produces important quantities of goods for the consumption of the monarchy and for export. The spinneries are in great part independent establishments, but many manufacturers of cloth and woollen goods are provided with machinery for spinning. The number of spindles at present is about 600,000, half of which are in Moravia, especially at Brunn and its neighbourhood, the rest are in Bohemia, Silesia, Galicia, Lower Austria, Tyrol, &c.; 30,000 looms, including 1,500 power looms, are employed in the manufacture of cloth and similar woollen goods, by a far advanced wholesale manufacture, as well as by small retail traders and by house industry, principally at Brunn, Reichenberg, Bielitz-Biala, and Jaegerndorf. The Brunn manufactories produce principally fashionable goods; Reichenberg, simple cloths and péruviennes; and Silesia smooth coloured cloth and lighter fabrics. The reduction of the import duty on woollen goods (T. P. 54, b. and *c.*) from 36 florins and 54 florins to 15 florins and 35 florins per tariff centner has given an extraordinary impetus to the competition of foreign woollen goods, especially of the cheap sorts of English manufacture, but the foreign demand for Austrian manufacture does not do justice to the perfection and value of the goods.

Although the Austrian, and still more the Hungarian wools, are peculiarly adapted for combed wool yarn, yet long wool spinning has not yet been largely developed in Austria or in Hungary. Austria has only eight establishments with more than 50,000 spindles, of which the most important is at Voeslau; of the rest, six are in Bohemia, and one in Upper Austria. Their produce is not enough for the home demand, and large quantities of combed wool yarn, partly spun from Hungarian wool, are imported from England and France. *Long wool weaving* centres in Reichenberg and its neighbourhood where several large establishments exist; there are separate factories also at Neugedein in Bohemia, and in Upper Austria. The manufacture of *mixed fabrics* centres in the Ascher district; for fabrics of cotton and wool, in Aussig, for wool and silk; and at Warnsdorf in Bohemia, for cotton, wool, and linen, also in Silesia and Lower Austria. The quantity of these mixtures sent into commerce is very considerable, to the value perhaps of 20 million florins. The manufacture of *shawls* is far advanced in Lower Austria, but fashion has neglected this article of late in favour of handkerchiefs, and the demand for Vienna shawls is consequently not so good now as formerly. *Carpets* are made in respectable quantities of simple designs generally by one

Vienna firm; also in Upper Austria, at Maffersdorf near Reichenberg. Cheap carpets are a house industry in the Tyrol. The whole number of looms for combed wool, yarn, and mixed fabrics now at work is about 15,000. *Printing on woollen goods* is concentrated in Bohemia; while there are several establishments in Lower Austria; the printing, however, is mostly done, with the dyeing of woollen and mixed goods, in the factories that weave the stuffs.

Manufacture of Flax, Hemp, and Jute.—*Flax spinning* has been extended in an extraordinary degree in Austria, so that the quantity of raw material produced in Austria and Hungary is not sufficient, and large imports are required, principally from Russia. Hand spinning has generally given place to mechanical; for this there were, in 1862, 40 establishments with 150,500 spindles; and in 1870 62 spinneries of flax yarn with 370,790 spindles, so that the number of the spindles had increased in eight years more than 146 per cent. Most of these are at Reichenberg in Bohemia, the town of Trautenau in the Riesen mountains being a principal centre of Austrian flax spinning. Other establishments are in Silesia, Northern Moravia, and separate ones in Bohemia, Upper Austria, and Galicia.

Hemp spinning is not important in Austria. Hemp is only spun by hand. The mechanical spinnery of *jute yarn* has been taken up lately; two factories are at work in the neighbourhood of Vienna, at Simmering, and Floridsdorf. The last is quite new, but the first is in full operation, and does a large business for home trade and the East. It works, with 2,840 spindles and 147 looms, 35,000 tariff centners of raw jute per annum, employing 600 resident and 400 other hands, the last chiefly in sewing sacks. Jute manufactures brought from England have been used for many years in Austria, and several weavers in Moravia and Bohemia have imported jute yarn from England and Brunswick, which they wove for the most part in a mixture with flax tow yarn. The introduction of the whole process into Austria satisfies therefore a great want. *Linen twine*, spun by hand, is produced in considerable quantity at Schoenlinde in Bohemia; and machinery has been recently applied to this manufacture. The transition from hand to machine spinning of linen is rapidly progressing; but this is not the case with *linen weaving*. This manufacture is still done chiefly by hand looms in Bohemia, Moravia, and Silesia, and to less extent in other provinces; and there are only 346 power looms. For fine textures the linen of North Bohemia (Rumburg, Georgswalde), and Moravia (Schoenberg) is very celebrated, but the factories of the two Austrian jute weaving establishments compete largely with the coarser linen goods. Linen is a very important article of export in Austria.

Silk manufacture.—Previous to 1859 Austria stood at the head of the silk-producing countries of Europe for her production of raw silk, but lost this position by the cession of the Lombardo-Venetian provinces. Her production is now not more than 5,000 tariff centners, which is mostly grown and spun in the Tyrol. The production of *chape* is unimportant, it occupies only one large establishment at Goerz. But Austria takes a prominent lead in the manufacture of *silken stuffs*, especially smooth silk stuffs, and silk ribands. This industry centres in Vienna and Lower Austria, where in 1870 there were 165 manufacturers of silk and velvet and 119 riband makers, whose united productions represented a value of more than nine million florins. Insufficient supply of labour, and continued rise of wages in Vienna checked the extension of this manufacture which might under other circumstances have been looked for during the last two years, and caused several producers to remove their factories to the country.

Other branches of textile manufacture.—*Lacemaking*, established in the Bohemiam Erz mountains for three centuries, was very prosperous from the commencement of last century. The discovery of machine made lace raised a strong competition to it, but the real lace soon recovered its importance, due to its originality of design. Lacemaking in the Erz mountains, especially in the districts of Graslitz, Joachimsthal, and Falkenau, employs about 15,000 workers, whose productions represent a value of more than a million florins. *Plain embroidery* is the most important branch of house industry in Vorarlberg, introduced from the neighbouring cantons of Switzerland, where

its produce is disposed of. It is also introduced among the lace makers of Bohemia, who took it up under the pressure of the competition of machine made lace with their own special industry. *Fancy embroidery* and *passementerie* is centred in Vienna, where it is produced to the value of over four millions florins. This industry is also carried on in Prague and other country capitals. *Hosiery* manufacture is extensive in North Bohemia and the Ascher district, where it is carried on by retailers and factories. *White linen, corsets, cravats, parasols* and *umbrellas* are made in Vienna, where the manufacture of linen articles has greatly increased of late years. The production of the above articles exceeds in value ten million florins. Large factories have recently been established in Bohemia and Lower Austria for white linen goods. *Artificial flowers* are chiefly a Viennese industry. The number of traders in 1860 was 357; in 1865, 311; in 1870, 312. In the last-named year they employed 897 hands, and produced to the value of $1\frac{3}{10}$ths million florins. The composition of the flowers is confined to large establishments, the manufacture of their parts occupies many small retailers. The Vienna trade exports medium quality to Roumania, Greece, Russia, Italy, and North America; but for fine goods the Paris manufactures compete with it even for Austrian consumption. This has long been a profitable industry in the northern districts of Bohemia, Hainspach, Rumburg, and Schluckenau, and is still more extensively carried on in the neighbouring villages of Saxony (Sebnitz, Neustadt, &c.) Many Bohemian manufacturers removed their industry to Saxony to take advantage of the more favourable conditions of trade existing there; but Austria has recently taken measures for the protection of this industry. The *manufacture of clothing*, especially for men, holds a very satisfactory position in Austria, both as to taste and cheapness of production. A very considerable trade is carried on in Vienna and Prague in ready made clothes, made by large wholesale establishments for use by the population of the cities, and for export. Small retailers work for local consumption. In the manufacture of women's clothing the Austrian industry has not yet achieved independence of Paris fashion, and for this reason, and in consequence of the paucity of available material manufactured in the country, it has not at present attained much importance.

7. Manufactures of Leather and Leather Goods.

Tanning, at which altogether about 4,000 large and small works are employed, does not suffice for home demand, but much of its wholesale produce is of excellent quality. The finer kinds of leather are for the most part imported from abroad, also Italian sole leather and Turkish kid, but the Russian leather formerly extensively imported is now quite replaced by home produce. The most important tanneries are in Moravia, Lower Austria, Bohemia, and Goerz.

Shoes are manufactured wholesale in Vienna, Prague, and several other places in Bohemia, Moravia, and Styria, and are largely exported. Vienna is almost limited to fine goods, especially fine ladies' shoes, but the large establishments in the countries last-mentioned principally make ordinary and medium fine goods. *Glove-making*, previously confined to home consumption, has, during the last eight years, since the introduction of machine cutting into the Austrian manufactories, been greatly extended. Our home manufacture, after important improvement of detail, has since then been made an article of commerce abroad, so that now the better sorts of Viennese and Prague manufacture are perfect specimens of lamb's leather gloves, whilst Paris, Brussels, and Grenoble still retain their superiority in the manufacture of kid gloves. The colouring of the leather has not improved to the same extent as the making of the gloves. For *wallet makers' ware* and *leather ornamental goods*, Vienna has acquired universal renown. The Prague manufacture of the last-mentioned goods deserves notice. Foreign competition is only of consequence in respect of ordinary and medium qualities.

8. Manufacture of Paper and Paper Work.

The manufacture of *paper* of all kinds has, quite recently, been greatly developed in Austria, and considerable quantities are now produced for home

consumption, which has materially increased, as well as for export, especially to the East. The scarcity and steady increase in price of fibres have led to the use of substitutes, especially wood substances, in the manufacture of paper. There are 90 paper manufacturers and about 100 paper mills; the most considerable are in Lower Austria, Bohemia, and Styria. The circumstance that the hand paper mills show a diminution, but the machine factories an increase, must be hailed as a sign of the higher development of Austrian paper industry. *Coloured papers* of all kinds are for the most part made in Vienna, and it is worthy of notice that the export of fine goods to England has increased. *Cigarette papers* and *wall papers* are made in Vienna and in Bohemia, and Vienna is a centre for the production of *playing cards*, *book binding*, *cardboard*, and *pasteboard* manufactures. A number of persons find employment in the districts of Gablonz and Teplitz in the manufacture of *papier maché goods*.

9. MANUFACTURES OF OTHER ANIMAL AND VEGETABLE MATERIALS.

Plaits of straw, *bast*, *rushes*, and *basket* work are made in large quantity in Vienna and other chief towns, and in Northern Bohemia and the Tyrol. *Straw hat-making* is, however, rendered less remunerative by the dependence of the fashion on Paris, and the necessity of importing most of the raw material from abroad. Manufactures of *wood*, favoured by the wealth of the country in timber, are extensive and supply articles of export. *Carpenters*, *upholsterers*, and *turners'* goods are made in the capitals, but in especial perfection in Vienna, and (especially the furniture of bent wood) are much prized at home and abroad. The *carving of woodwork* and *bone*, &c. (toys and other objects) forms a house industry of the Bohemian (Erz) mountains, the Salzkammergut and the Tyrol. A peculiar branch of industry is the manufacture of mats, which employs more than 2,000 persons in the district of Schluckenau in Bohemia, the produce of which, in the form of table covers, window blinds, caps, hats, &c., is for the most part exported across the ocean.

Finally, important progress is noticeable in the manufacture of *felt hats*. The felt manufactories for this raw material exist nowhere but in Austria, and afford to the hat-making industry considerable advantages.

B.

OUTLINES OF THE MOST IMPORTANT LAWS AND COMMERCIAL TREATIES SANCTIONED DURING THE LAST TWO DECADES FOR THE PROMOTION OF COMMERCE.

In addition to political institutions, to the influence, hard to appreciate too highly, of foreign events, and to the far-piercing effects of natural causes displayed in the quality of the harvests, it is the labours of statesmen and government functionaries, resulting in a series of measures and laws, to which is due that development of home productiveness which appears in the statistical tables contained in this pamphlet. But valuable, and, in its successful issue, highly interesting as an exhaustive history of the legislation of the last few years would be it would exceed our limits. We shall confine our remarks, therefore, to a general historical sketch, in the merest outline, of the purport of the most important commercial treaties, and of some laws especially remarkable for their tendency to the promotion of trade.

The ruling principle of the Austrian customs' policy in the first half of the present century of exclusion and isolation is eloquently expressed in the tariff of 27th December 1838. This tariff, though it comes in the fourth decade, contains, being only a resumé of many preceding regulations and decrees void of system, 69 prohibitions of importation and 10 of exports. The exertions of List, to win for Austria a commercial policy worthy of her extent, position, and industrial capacity, had been fruitless. The proposition of a customs and commercial confederation for Central Europe agreeing with natural conditions was misunderstood and disliked. This indifference to progress and low estimate of the power of production appears the same in the tardy repeal of customs limitations within the frontiers; within Austria they were removed in 1816, and for Hungary not until 1850. The spirit

guiding Austrian commercial policy, which made itself heard in the establishment of a wide commercial area not subdivided, spoke next in the tariff that came in force 1st February 1852. The great number (654) of articles subject to duty was diminished by more than half. Prohibitions of import, export, and transport were abolished. The import duties were reduced on raw material and objects used in manufacture, and exportation was facilitated. The idea of a union in commercial policy with the German States, took its first practical effect in the customs and trade treaty concluded in February 1853 for 12 years with the Zollverein, and affecting Lichtenstein, Parma, and Modena, which facilitated the frontier traffic, favoured articles used in manufacture for both parties, limited transit duties, and materially facilitated the mutual exchange of agricultural and other produce. A further step in this direction was the harmonizing of the systems of customs procedure and frontier guard of the parties to the treaty. A revised universal tariff arising out of this treaty came into effect 1st January 1854, and (apart from the reforms it introduced in the regulation and gradation of positions and customs rates suited to the conditions of production, by the reduction of particular rates and by giving radical relief to export and to the system of customs procedure) consistently promoted the development of the principle of stimulating the manufacture of finished goods, of increasing its productive capacity by facilitating the importation of half-manufactures, and of favouring the use of articles of consumption. We must regard as the complement and indispensable completion of the new system of commercial policy the ultimate liberation of commercial industry that followed. At the demand of science and the compulsion of altered conditions of competition, trade industry was at last set free from the fetters that smothered its energy and paralysed its powers of action. The pursuit of every branch of industry in the compass of the trade law (with the exception of a few trades bound to the award of a concession) was declared free by Imperial Patent of 20th December 1859. The combination of several trades in one person, and the employment of labour of other different trades for finishing articles, were made lawful; the extension of trade, by the establishment of branches, by the erection of several workshops, by the employment of travelling agents, was materially facilitated by law; market regulations were regulated from a trader's standpoint in the most liberal sense; the conduct of business in a parish was declared independent of domicile; examinations were discontinued; and only in the so-called "Zwangs-genossenschaften" a part of the former restriction was maintained.

The disabilities that excluded Jews (in Galicia, Cracow, and the Bukowina) from certain trades (apothecaries, innkeepers, brewers, and millers), and the restrictions on their free choice of residence fell away in January 1860; and, in a similar spirit, the introduction of foreign joint stock companies was permitted in Austria, with exclusion of companies of insurance. In April 1867, October 1868, and January 1869, the Dutch, Belgian, Russian, French, Swiss, and Italian companies obtained the right of trading in Austria, and accorded it to Austrian subjects in their respective lands. In a few years the effects of the liberation of trading industry from the bonds that impeded it surpassed all expectation. As formerly in France so now in Austria, free trade proved the mightiest agent, the most effectual stimulus to industrial productiveness.

The Act of April 1870 comes here as a necessary consequence of the appreciation and honour of labour that underlay the commercial regulations, giving freedom to the operation of economical forces by repeal of the penalties enacted against persuading employers or doers of labour to enforce their own conditions of contract.

In the meantime the government pursued the construction of an Austrian-German customs and commercial area, with a persistence worthy of the object. Besides the inducements given by natural conditions, they were influenced by the widely spreading revolution in the views that prevailed of commercial policy. Even France, so long inclined to protection, entered the path of free trade with her commercial treaties concluded with England, Belgium, and the Zollverein. But a series of domestic and foreign circumstances impeded and restrained the statesmen working for a complete

union. The fruit of the long and discursive negociations with the Zollverein was the treaty concluded in April 1858 and modified in March 1868. It was based on moderate protective duties for both territories. In the tariff of the Zollverein the duties on several articles used in further manufacture were altogether repealed; those on objects made of glass, iron, leather, and india-rubber, and on furniture, yarn, iron, steel, wine, and some articles of consumption were more or less reduced. A rational protection was conceded to manufacutring industry by the improved graduated arrangement of finished manufactures, among which some of the customs rates were raised by Austria. Prohibition was declared inadmissable on principle. Transit dues were entirely abolished, export dues were only retained by the Zollverein on rags and other refuse used in paper making, and by Austria on the same articles, plus hides and skins. The "improving" trade * was regulated; the principle of complete reciprocity in trading privileges laid down; the subjects of the contracting governments assured reciprocally of protection.

A treaty had already been concluded with *Turkey*, in May 1862, to remain valid for 28 years, relative to trade and shipping. The export of Turkish produce and the import of Austrian goods were charged with an ad valorem duty of 8 per cent.; goods sent back to their source within six months against payment of the difference to their owner, were subject to a transit duty of 2 per cent. For *Bosnia* and the *Herzegowina* the ad valorem import duty was fixed at 6 per cent., export made free, and the import of Austrian salt charged with 20 per cent. on its value. In December 1865 comes a commercial treaty with *England* (supplementary treaty December 1869) in December 1866 one with *France*. By the provisions of the former, it is stipulated that the Austrian customs tariff (maintaining its system of duties chargeable according to weight) shall be regulated in such a manner that the duty on British productions to be collected from 1st January 1867 shall not exceed 25 per cent. of their value with calculated addition of costs of transport, insurance and commission to the Austrian frontier, and shall be regulated by the average value of the articles called by one and the same name in every clause of future Austrian tariffs. From 1st January 1870 the maximum of this duty is not to exceed 20 per cent. ad valorem plus additions. The average price of the chief market of the United Kingdom in 1865 is to serve as basis. Each contracting party is entitled to demand a revision of the estimate of value.†

From and after the 1st January 1870 the maximum of these duties shall not exceed 20 per cent. of the value with the additions above defined.

Articles constituting State monopolies, namely tobacco, salt, and gunpowder, and further, goods comprised in Classes I. and VII. of the present Austrian tariff, are exempt from these maxima.

Article IX. stipulates that "The subjects of one power shall, in the "dominions of the other, enjoy the same protection as native subjects in "regard to rights of property, trade marks, patterns and designs for manufactures."

In the treaty concluded for a term of 10 years with *France* transit dues were entirely abolished and export duties only retained on three articles. Produce and manufactures of one country imported into the other were to be subject to no higher duties within the country than similar goods of home manufacture paid. Reciprocal assurance was exchanged that all matters relating to import, export, or transit of merchandise should be regulated on the footing of the most favoured country. Both states combined to protect

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* Veredlungsverkehr (intermediate or final process in manufacture made the subject of contract).

† This clause runs verbally "The Austrian Customs Tariff (the present system of calculating customs duties by weight being maintained) shall be so regulated that the duty to be levied upon articles, the produce or manufacture of the dominions of Her Britannic Majesty, upon their importation into the Austrian states, shall, from the 1st January 1867, not exceed 25 per cent. of the value with the addition of the cost of transport, insurance, and commission, necessary for the importation into Austria, as far as the Austrian customs frontier, and for this purpose there shall serve as basis, the average value of articles included under one and the same denomination in each position of the future Austrian Tariff."

manufacture in the matters of trade marks, patterns, and designs; any become public property in one state could not be the subject of excluding privileges in the other. Manufactures and merchants of one State were entitled to make purchases in the other for the purposes of their business, and canvass for orders with or without samples without taxation. The arrangements which were settled in respect to the importation into France of metals, machinery, textile fabrics, leather ornamental work, meerschaum goods, lucifer matches, furniture of bent wood, and some descriptions of glass ware are remarkable, With the exception of the two classes of goods first named these articles were subject to taxation by weight or ad valorem to the extent of 5 to 10 per cent.

In 1867 commercial treaties were concluded with *Belgium* in February; the *Netherlands* in March, and *Italy* in April. In the commercial treaty concluded for a term of ten years with Belgium are conditions, that the subjects of one State upon entering into business of manufacture or trade in the other State shall be subject to no greater taxation than natives; that consuls and consular agents on both sides shall enjoy the privileges, liberties, and immunities of consuls and agents of the most favoured nation. A condition to an effect similar to that of the above-mentioned referring to traders is introduced in favour of produce and manufactured goods. Both parties guarantee in all that has to do with transit and export the treatment of the most favoured nation. In the same way the treaty concluded with *Italy*, based on the principle of precise reciprocity, introduces the most thorough reforms in facilitating commercial traffic, and aims at favouring the pursuit of business by the subjects of either State within the borders of the other.

In July 1868 there was a treaty with *Switzerland*, in September 1869 one with *China*, *Japan*, and *Siam*, and in March 1870 one with *Spain*. Like the liberty of traders,* this customs policy, introducing the transition to the ways of free trade,† had a stimulating and propelling influence. In face of the steady increase of exports of finished manufactures the opposition long maintained with all legal means of resistance by the manufacturers diminished and gave place to new views.

Two Acts of June 1866 deserve to be mentioned in this place. One relates to the erection of public establishments for *weighing and meting*. Of this class are declared to be those establishments which are authorised by Government for weighing and meting goods, and proving with the alcohol meter the degree of distilled spirituous liquors for third persons, and are empowered to issue vouchers, having the authority of official documents, respecting the operations of weighing and meting done by them. The second law lays down general principles for awarding concessions for *public warehouses* (bonded warehouses and (duty paid) warehouses) "in order to supply com-
" merce to the greatest extent with those facilities contemplated by the
" general customs regulations, and to promote as much as possible the trade
" in merchandise and mercantile credit." The bonded warehouses are intended to contain within the customs frontiers untaxed foreign goods until they are forwarded to their destination, *i.e.*, until they pay import duty, or are forwarded, or are re-exported; to keep exempt from taxation goods exported beyond the customs frontier, preserving their nationality until they are passed into trade or reimported; in towns which with respect to their octroi duty on articles of consumption are proclaimed "closed" to store up the taxable goods until they either pay duty or are sent out of the town again. Warehouses are such as are used for storing duty and tax-free goods or goods that have paid duties and taxes.

The settlement of the political relations between the kingdoms and countries (of Austria) represented in the Reichsrath, and the lands of the Hungarian monarchy, or the settlement of the economical relations of the two halves of the empire (December 1867), was of distinct importance to the progress of the social-economical development. Recognising the existence of a community in commercial interests from the standpoint of the Pragmatic

* Gewerbefreiheit = liberation of traders from restrictions of guilds, &c.
† Freihandel = trade freed from customs restrictions and burdens.

Sanction, the Hungarian Reichstag declared its readiness to exercise its right of regulating taxation by independent legislation and its own responsible government, in the form of a treaty for taxation and commerce with the countries represented in the Austrian Reichstag. This was then concluded under the following conditions:—The territories of both parties form (for the term of the duration of this treaty) one trade and customs territory, surrounded by one common customs frontier. No intermediate customs frontier, may, during that term, be created. Either party may only levy on articles imported from the territory of the other party, such dues as similar articles produced in its own territory are charged with. Existing exemptions continue exempt at the common frontier. Treaties concluded with foreign states regulating economical relations with foreign countries, especially treaties of commerce, customs, shipping, consular, postal and telegraph, are equally binding, whilst they continue in force, for both territories. New treaties of similar purport may be negociated and concluded, under reserve of the sanction of both legislatures according to the constitution, only by the Minister of Foreign Affairs, on the basis of agreements to be made between the proper ministers of both parties. The customs tariffs and laws now in force remain in force in both territories and can only be altered with the consent of both legislatures. The levy and control of the customs continues committed to each government within the limits of its own territory; for mutual control and for the maintenance of a uniform process in the control and levy of the customs duties, inspectors are appointed by each party. The mercantile shipping of both parties carry one and the same flag, which combines with its former emblems the colours and arms of the Hungarian monarchy. The Austrian Lloyd's is under the control of the Foreign Minister, who will act in concert with both ministers of commerce in the maritime and postal arrangements of that institution. The existing railways shall be managed in both territories on similar principles, and new railways, insofar as the interests of mutual traffic require, shall be regulated by similar principles of construction and traffic. The whole consular service is controlled by the common Minister of Foreign Affairs; appointments of consulates are to be made in concert with both Ministers of Commerce. Revenues derived from salt and tobacco, and brandy, beer, and sugar dues will be regulated during the validity of this treaty by similar laws and regulations in both territories. The Austrian currency, until it is altered by law, remains the common currency of the country; but identical proposals shall, as soon as possible, be submitted to the representatives of both parties, for the introduction of a currency in gold; in these the principles of the Paris currency (mint) conference shall be adhered to, as nearly as possible. Either party is at liberty to issue small coinage of 10 kreutzers or less, which is to pass in the territory of the other party. The systems of weights and measures of both territories shall be made as nearly identical as possible. The subjects of one territory desiring to trade or seek work in the other shall be on the same footing as natives in respect to admission to trade and dues. In the grant of hawker's licenses, patents of invention, and the protection of trade marks and patterns, and the arrangement of postal and telegraph systems, the principles adopted in both countries shall be as nearly identical as possible. The award of concessions to societies of credit or insurance is reserved to the ministry in whose territory the society is domiciled. To prepare and agree upon identical principles for the international commercial treaties above mentioned; and for the regulation by law and the control of the customs, of the indirect expenses, and other matters, a conference for customs and commerce shall assemble, formed of the Ministers of Commerce and of Finance of both parties, and (in so far as the object of the conference affects foreign relations) the common Minister for Foreign Affairs or his representative, and to this conference experts may be summoned.

This treaty was provisionally concluded for a term of ten years, and unless notice be given to the contrary, is understood to continue in force for further ten years, and so forth from ten years to ten years. After expiration of five years either party is free to commence negociations for its modification,

which the other party is not permitted to decline. If an agreement is not arrived at in this way either party may give one year's notice of withdrawal.

In May 1868 a law was passed by which an institution that deserves to be characterised as mediæval was abolished, viz., *imprisonment for debt.* Execution on the person of the debtor was declared thenceforward inadmissible. The principles of social economy had long since characterised this institution as doubtful in its benefit to the individual and distinctly pernicious to the commonwealth. Another impediment to trade was cleared away by a law passed in June of the same year which, starting from that of 14th December 1866, gave to capital that liberty of action of which labour reaps the advantage. The provisions hitherto in force by which the rate of interest to be fixed by contract, and the amount of penalty to be arranged upon loans and credits, were restricted by law, were repealed. It became lawful according to contract, or in case of action for debt to demand compound interest, and interest without limit as to time.

Further, an institution in the highest degree beneficial to economical progress and provisionally introduced in 1850 was definitely settled by the law of 29th June 1868; that of the Chambers of Commerce (Handels-und Gewerbekammern). Their function as general consultative corporations is, to take into consideration wishes and proposals relating to all circumstances of trade and commerce, and the condition of the means of traffic, and both at the invitation of the ministries or authorities, and on their own initiative, to bring to the knowledge of the officials their opinions and suggestions as to the requirements of trade and commerce in the above respects, and in respect of projects of law affecting commercial or industrial interests, and upon the erection of public institutions for the promotion of trade and commerce, and on occasion of material altrations in their organisation to express their opinion. They register trade marks and patterns of manufactures, keep the '*archives*' of the marks and patterns, the registration of firms and partnerships, &c., and of the banks and credit institutions established in their respective districts. They testify to the existence of trading customs, take charge of the examination and nomination of brokers, "councillors of the exchange" (Boersenraethe), and assistants at commercial courts (Handelsgerichts-beisitzer), and register commercial statistics. They act as umpires in trade disputes, and send into the minister of commerce, an annual summary recording their observation of the position of trade in general in their districts. They stand immediately subordinate to the Minister of Commerce; but are required on demand to supply information to other ministers and functionaries of their district. The officials of the government and parish, all bodies corporate and societies, trading, manufacturing, traffic, insurance, banking, and loan societies, and individual traders are obliged to give the chambers, on demand, whatever information they require. Each Chamber of Commerce consists of 18 at least, or 48 at most, effective members, of whom a certain number are required to be domiciled at the seat of the Chamber. The effective members are elected for six years. At the expiration of three years, on 31st December, half the members retire in rotation of seniority, and are replaced by new elections. They can extend their activity beyond the circle of the trades they represent by the appointment of "corresponding members," &c.

The postal and telegraph systems have progressed steadily and uninterruptedly, both in the interior and from the international standpoint. A number of international acts, laws, and regulations, bear witness to this. The postal treaty of December 1851, the object of which was the introduction of general improvements in the posting (carriage) system, was the first of a series of measures adopted in consequence of regularly repeated conferences. (September 1855, February 1857, August 1860, January 1862, &c.) In the same way the German-Austrian Telegraph Union, formed in July 1850, initiated a severely organic development. (Revised treaties: October 1851, September 1853, May 1855, November 1857, May 1863, September 1865, July 1868.) The telegraph system was greatly benefited by the convention of this union with France and Belgium in June 1858, with Switzerland, October 1858, and with Russia, January 1860.

Traffic was improved in the most energetic manner by arrangements such as those relating to the collection of amounts chargeable on goods sent through the post (Postnachnahmen) May 1860, modifications of the telegram tariff (May 1863, December 1865, March and June 1870), and of the rates for inland carriage post, January 1867; by arrangements for ordering payments of money by telegram, reduction of the charge and removal of the compulsion for registration of express letters, April 1868, introduction of correspondence cards for domestic use, September 1869, &c.

A similar feature of progress consisting in the constant repetition of relief by degrees from impediments appeared in the passport system and internal transport of goods. The "pass card" treaty with the German states occurs in the year 1850. In February 1857 the revision of passports at the frontiers was restricted, in July 1859, on the ground of the above mentioned treaty, pass cards were accepted in lieu of passports, and the books of servants and workers. In July 1862 the compulsory embassy visé of passports was abolished with respect to Denmark, Belgium, Switzerland and Bavaria; and, in May 1863, for other states; finally, in November 1865 the revision of passports at the frontiers was abandoned; and in 1867 the police regulations as to passports were generally settled in a manner favourable to traffic.

In November 1858 the stamp on merchandise in Vorarlberg, and the dues levied in respect of it were abolished. By decrees of July and December 1860, December 1861, January 1862, July 1868, August 1869, gradual relief was given to the obligation of control over certain goods, coffee, sugar, cotton goods, raw silk, and unspun silk refuse. To complete this record we must mention the introduction of credit at the custom house (Zollcreditirung) and the repeal of the tolls on transit to Dalmatia.

The law passed in December 1858 and made more favourable and extended in its range in November 1860, and May and June 1865, for the *protection of trade marks*, &c., and *patterns and models*, bore also the character of trade-promoting, and so did the exchange regulation (bills) and the book of commercial law of December 1862, which as eminent legislative achievements, founded on deep study of the requirements of traffic, and taking common effect in the German producing country, gave certainty and firmness to traffic, without impeding its course or normal development. For the hopes, already in part fulfilled, that attended it, the law of 14th May 1869 introducing commercial courts of law deserves notice. Before these courts are brought the disputes that arise between employers of labour or their representatives on the one hand and the workers on the other, or between the workmen themselves, viz.:—*a*, disputes as to wages; *b*, disputes relating to discharge from service, work, or apprenticeship; *c*, disputes as to damages for leaving service or for discharge; *d*, disputes as to making good damage done to machinery, &c.; *e*, disputes relating to allowances for pension, sickness, or similar workmen's funds, so far as these funds are contributed to by employers as well as by workers. The members of the commercial court are elected half by the employers half by the workers, in distinct elective bodies. Commercial courts may be established in towns or districts, wherever similar or allied manufacturing trades are carried on on a large scale. Their foundation requires an order from the Ministry of Justice backed by the Ministry of Commerce and the assent of the Landtag (parliament).

If ever a retrospective glance at the past should fill us with contentment and confidence in the future, this is the case with the retrospect on the two decades of Austrian history that we have passed in review. In imperishable characters they bear engraved the maxim that our gratitude for the progress we record is for the most part due to labour, to the high appreciation which has been gained for it, and to the liberation, stimulation, and promotion of labour power.

M.

THE COMMERCE OF THE WORLD.

Report of DR. CARL THOMAS RICHTER, *k.k. Professor of Political Economy at the University of Prague.*

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In recognition of the extraordinary importance of the commerce of the world, and instigated by the desire to illustrate the share taken by some of the most important commercial ports of England, especially by Liverpool and Hull, in the international exchange of commodities, the respective local committees for the International Exhibition of London in the year 1851 made the attempt, as interesting as it is instructive, to represent the extent of the traffic provided for by those ports, and the articles of commerce that it embraced, by the exhibition of samples of the objects imported and exported, illustrated by statistical statements of imports and exports, origin and destination, price, &c. Although the two committees who took in hand the execution of this idea had only a short time and inadequate material at their disposal, their attempt was highly successful, and these additions to the Exhibition were at the same time instructive and advantageous to the general community, as well as to persons immediately interested in their subject matter. The first found in them a view of the extent of the foreign trade of the ports in question, and access to information which was formerly monopolised by merchants and statisticians, and the latter the opportunity of enlarging the knowledge they already possessed of the origin and destination of merchandise, and bringing into the scope of their business operations articles hitherto unknown to them. This idea was carried into effect a second time, in respect to Liverpool, at the London Universal Exhibition of 1862.

On the right of the entrance into the pavilion the English Commission, through Professor Archer, exhibited in a few small compartments a collection of articles of import, which contained the sum total of all raw material, each separate group being explained by tabular statements, giving the quantities, origin, and purpose of the goods, and the total amount of all raw materials imported into England in the year 1871. The collection was arranged in small glass bottles such as would be well adapted to ornament the shelves of a museum or a commercial school, while the tabular statements were hung up at an almost unapproachable height, and it was a matter of great labour to study even the most important articles of import; such as tea, jute, Manilla hemp, horns, teeth, &c. We shall mention in another part of our treatise the gigantic extent of the trade of England, which was set forth here in a clear but unfortunately too condensed form.

With the commencement of the present century and the introduction of new forces destined to decide the course of the world's progress, Holland was confined to her diminished colonies, to trade with these and to the intermediate trade with Germany. The inheritance of her power, as of that of those older states whose decadence began in the 15th century, fell to the English.

At the time when the Hanseatic towns bought skins of foxes from England for a gulden, and resold the foxes' tails to England for three times that price, English agriculture and pastoral industry, supported by a clever government and sound national sense, had risen to considerable importance. At the beginning of the 14th century, there were already estates possessing 10,000, 24,000 and 28,000 sheep, and the export of wool was reckoned by hundreds of thousands of pounds. The cloths produced by England were mostly exported raw to Belgium, to be dyed and finished there. But gradually agriculture and the cultivation of wool, always developing in extent, were supplemented by a large manufacture of woollen goods, which was promoted in every possible way by Elizabeth, James I., and Charles I. In 1354, the export of woollen stuffs already amounted to the value of 2,000,000*l.* sterling, being about nine-tenths at that time of the whole value of English exports. Cloth was always a good object of trade either with Northern Europe or the Levant and the East and West Indies. Nothing is more rationally consequent than the fact that the flourishing of one manufacture is a means of promoting

the rapid development of another among a people who are energetic. In England, at the date we are speaking of, the leather and metal industries soon began to flourish; the production of coal followed them; then shipbuilding was gradually promoted by the demands of the coasting trade; fishing, chiefly of herrings and cod, followed naturally. The intolerant governments of Spain and France drove many excellent workmen into other lands, and by the side of the industries devoted to art and luxury which France and Spain supplied with artisans, an active life of trade and commence soon began to spring up. So long ago as the 12th century weavers of wool emigrated from Flanders into Wales; later on, Italians came to set up banking and exchange businesses in London. The Jews came over from Spain and Portugal, and the merchants from Venice came over with their shipping and capital to the world that was springing into life in England. Whole communities of industrious labourers and wealthy capitalists were driven forth to this happy and free foreign country by the religious persecutions that attended the Reformation throughout the continent of Europe. Government and people worked together at their task, and before the continent had learned to regard the aristocracy as anything other than a privileged condition, it was intimately connected in England with the most vital interests of the population; with trade and commerce. Before the name of free citizenship was known to the nations of the continent it had grown powerful in England by labour and consequent opulence. And before the continental nations understood that land and people, dynasty and government, can be but one body with one common interest, this knowledge in England had revolutionised the form of state and government, created a republic, named a protector, assumed the yoke of an enlightened absolutism. Is it wonderful that this was possible? People and government alike were well aware that that had to come which came, and that that which was was good. The state internally powerful now bent her regards abroad to distant regions of the world and its oceans. With one act of commercial policy, one act of the English administration—the navigation laws, began the great development; with one act of state policy—the foundation of the East Indian Empire, it ended. Then when this world, foamed round by the sea, placed far from European conflict, had grown mighty, it was easy for her to dispose of the economical destinies of the universe. England conquered or acquired the keys of every sea and ruled in the north and the south, in the east and the west, nothing remained free but the Dardanelles and Suez, the Sound and the Isthmus of Panama. Hereupon followed the commercial treaties which England made with the continental states, and the powerful, often violent commercial policy to which India had bowed was directed to the oppression of America, but it brought wealth to England. The cloth manufacture developed in an extraordinary manner, supplying, all the demands of the continent and the whole of the East. The linen production worked into almost perfect independence of the industry of Germany, which was ever more and more diminished by war and poverty. The glass, porcelain, and stoneware manufactures represented the value of millions, so did the manufactures of paper and of leather. Iron, the export of which was still forbidden in the 17th century, early in the 18th was sent throughout the world; and the production of coals and minerals was long regarded as the chief sources of wealth. To all this was added the produce of a new branch of industry, the manufacture of cotton, which at the commencement of the 19th century, already represented a value of almost 50 millions. The whole manufacturing activity of the United Kingdom has increased almost two hundred-fold in the course of scarcely three centuries. The value of freehold land, sharing the increase, was already estimated at the commencement of this century at 500 millions. In the course of this process of development England manufactured the raw material of almost the whole world and paid for it with her productions and with the gold (earned by her at the valuation which then prevailed) which India, China, and the East were still able to pay for their enjoyments. And hereby the commerce of the world has taken, in the course of the centuries, other paths and, partly also, other subjects of trade.

Nothing is a surer test of economy in a man than the continuous activity of his capital. The principal circumstance that excludes this for a time from its effectual application is the necessity that exists of transferring goods

through space, of storing away varieties of them in every place and assimilating in quantity production and consumption to each other. Property that goes from London to Vienna, or from Calcutta to London, is economically idle during its journey. It has suddenly become ballast, though before it was property, and in the course of weeks or months it will be capital. Everything that tends to shorten the duration of this condition contributes to the increase of the national property—is so much national wealth. When England first appreciated this, she began to construct roads and canals, to utilise her rivers for the transport of goods, and, wise in her internal arrangements, she was far seeing abroad. If the journey from one quarter of the globe to the other cannot be curtailed, it can at least be cheapened by the application of the forces of nature, and on this hint England pursued the great discoveries of science, and sought to crowd along the coast of Africa round the Cape of Good Hope with her fleet, which united England also to America, and to reap full advantage to herself from the sea route to India. The Navigation Laws made it possible to make her foreign competitors suffer severely from this; and circumscribed in their commerce, and mostly kept aloof from England and English colonies, they were crippled and weakened, whilst England acquired for herself the inheritance of the universal commerce of the world. In this way, then, had England, first increasing her internal economical forces, completed the perfecting of her means of transport, and manifested to the whole world their consequence as an element of power and wealth. The capital invested in this enterprise was of so much more potent effect, because, as the highways of commerce were changed, the materials traded in increased in number rapidly and considerably. America's natural wealth, and the development of the labour power of Europe, were powerful agencies in this process. Finished articles of manufacture and articles of food are always decreasing in quantity in the trade of England with foreign countries. In their place come, more important than they ever were, the inexhaustible raw materials of the new world, and as industry and manufactures advance, those of India also. England fetched home the raw material of the world for her work, and gradually distributed to the whole world the productions of her labour. Earlier centuries had witnessed precisely the contrary condition in the commerce of the world. And that furnished a new field also for the action of the power of capital invested in transport, which was developed by England in a similar movement. The original stuff, the raw material for the most costly work, will generally only repay the expense of transport, when the same ship that delivers it here takes manufactured goods in return, and sails back with them to the country that produces the raw material. The story of the foxes' tail and foxes' skin of the Hanseatic towns applied to England, if changed to the cotton and cotton goods of England, applies now to America and India, and to this day America is but just beginning. India and Egypt have not yet begun to discover the secret of erecting alongside the cotton spinnery the stores of cotton, and spindles and weaving machinery near the cotton-ginning machines. The events of the nineteenth century first disturbed the conditions under which England's wealth grew through three centuries to be dominant over all the world, and disturbs them now more and more by compelling all the European states to an increased participation in the universal fair and in the commerce of the world, and whilst the course of trade is diverted by the piercing of the Isthmus of Suez on the one hand, and the construction of railways in Asia on the other, and in effect turned back upon the channel of ancient times, the rapidity of transport in the latter case competes successfully with the cheapest rates of freight, and the Suez Canal offers advantages both of cheapness and great rapidity for the transport to India and the eastern parts of Asia. We shall return to these phenomena again, and shall only mention here that the history of the influence produced by these events cannot be written yet.

Now, what was the foundation of this rapid and powerful growth in prosperity of England, and on what was her means of influence, ruling the world, established? The consideration of this question is still important, and to give the certain answer to it over and over again is of great importance. How few men reflect on the elements that create and influence the history of humanity. How few men take the trouble of reasoning upon them. Napoleon III. made

a characteristic remark when he said that the state that was able to throw the most cannon balls at its enemies would dispose of the most merchandise in the commerce of the world. England has comprehended this whole centuries ago, and developed her mercantile supremacy side by side with the foundation of her political power. For this reason the history of the wealth of England is connected with the names of her kings, with the position and consequence of her aristocracy, priests, and ministers; and the policies of Walpole and of Pitt are of equal importance with the construction of her canals, the opening of her coal deposits, or the discovery of steam power. Politically powerful and economically rich, England was able to contemplate the destinies of the whole world with an unmoved eye, and without becoming involved in them, to reap her own advantage out of good and evil times alike. Being, moreover, by her geographical position and her historical development, almost utterly independent of Europe, she could avail herself of all events with the sole result of increasing by them her wealth and power. In our days see England supporting more easily and fortunately than the whole of Europe the North American War, so very menacing to her economical interests, and even in part drawing new advantages from it by liberating herself from the North American monopoly in cotton, and developing the produce of East India in a degree never anticipated before. Politically powerful and economically rich, England could govern the world, and be hard and severe to her enemies in matters of law and business. She dictated taxes and limitations of trade to the world, and claimed rights and liberties for herself. The linens and yarns that the English colonies brought from the continent they had to bring from English ports, and to pay upon them a tax of five per cent. German linen brought into England was subjected to an import duty of 40 per cent. If it went to English colonies 30 per cent. was restored, because there were other ways by which the German manufacture could be introduced into America. But in the year 1769 the Parliament was still deliberating upon the question of the levy of a tax of 40 per cent. upon all woven goods from Germany. History furnishes abundant subject matter for this commercial policy, which all the states of Europe have had to endure and be patient under. The state was hard and cruel also even to her own subjects and the best promoters of her prosperity. William Edward Hartpole Lecky has quite recently published in his "Four Historical Essays," a disclosure of the economical afflictions of Ireland, "which was offered as a victim to English industry, and reduced to "beggary by oppression and wrong for the good of the gluttons of the "Thames." Is it a wonder that the nation was able to convert all to her own purposes that the intellectual and physical labours of humanity produced; to bring all inventions into useful application; to stimulate powerfully her own inventive forces; and above all to be the first to bring into great and effective utility the development of machinery and the discovery of the application of the power of steam? Had the political destinies of Germany been other than those that the pages of the history of the 14th and 15th centuries record, she would, centuries earlier than England, have been able to clear the way for magnificent economical progress; she would have taken the lead in the exploration and peopling of America; she would have been able to repulse the Turks without trouble; and would, as in former years, have still sent her cargoes of manufactured goods to England and the rest of the world. But yet the question is doubtful, whether Germany, favoured with greater rulers and princes less romantic in disposition, would have had another political career than that she actually had. A country that forms the central heart of a quarter of the world is always the battle field of that quarter of its interests and aspirations. But of a certainty the government and regents could have done more for the people, that it might not have been left to meet the powerful rival who advanced with her merchandise instead of her cannon, in the so-called peaceful contention, poor and miserable, ignorant and weak, without roads, without credit or credit establishments, without self-government or liberty, without unity or consciousness of power. But the pages of this sad history have been written, and happily it is a history long passed by. The 19th century has raised Germany also to be an empire, and her work, powerful and creative within the country, spreads on all roads and highways now that are opened to trade and commerce.

Steam Power.—The tea kettle of James Watt dwindles down to a child's story, a fairy tale, when we contemplate the steam power applied in the present day to machinery. The steam that is generated by five pounds weight of coal, does the same amount of work as a strong man can in 10 hours labour. Let us now consider that Great Britain annually produces more than 117 millions of tons of coal; according to the relations of cost that amount represents rather more than the labour of 150 millions of working men. But England now only contributes one-tenth of the whole quantity of coal that is annually produced and consumed in the world. The whole quantity, therefore, represents the labour of 1,500 millions of working men. The whole of the living generation could not, therefore, suffice to replace the working power of steam. Moreover, other fuels are at work in addition to coal, and other mechanical forces in addition to steam, producing the articles that the world requires for its use. If we take into calculation the prices of coal and the cost of the steam power produced by coal, it is sufficient to say, that the sum of the coal produced by England in 1871 was of the value of 30,121,347 pounds sterling. If we calculate the cost of the maintenance of one labourer at 200 guldens for one year, or 20 pounds sterling, this renders for the above 150 millions of men, 30,000 millions of guldens, or 3,000 millions of pounds sterling. It is easy to perceive from this single example why, centuries ago, corn was so cheap and cloth so dear, whilst at present this relation is converted. For the entire textile industry of England in 1871, steam engines of 300,480 horse power, water force 8,390 horse power, and 450,087 men were employed. If we leave entirely out of the calculation the water power, the steam power, taking only three real horses for one in the calculation, represents 901,640 real horses working 10 hours a day. Now setting one-horse power at that of five men, this renders 4,507,200 men. Therefore, the manufacture of the 1,778 millions of pounds of cotton, and 323 millions of pounds of wool imported in 1871 would have required 4,957,287 working men working 10 hours a day. The expense reckoned at 20*l.* sterling per man would have amounted to 99,144,740*l.* sterling. Therefore the labourers' wages would have been exactly equal to the whole value of the exports of cotton and woollen stuffs. This was, in 1871, a little more than 100 millions of pounds sterling.

The European mercantile navy has developed as follows :—

—	Steamers.	Sailing Ships.	Total.	Tonnage.
1860 - -	2,974	92,272	95,246	10,800,647
1865 - -	4,021	95,993	100,014	12,436,208
1869 - -	4,289	96,009	100,298	12,761,875
1871 - -	4,824	92,053	96,877	12,607,627

Of this quantity, after a rapid increase of her fleet of steamers, England alone takes 1,340,538 tons, having in 1860 owned only 454,327 tons. France owned in 1870, 142,942, and in 1860, 68,025 tonnage in steamships.

The leading seafaring nations own a navy on the high seas at present divisible as follows :—

	Ships.	Tonnage.
England - -	25,892	5,781,509
British Colonies -	10,975	1,472,019
British flag - -	36,867	7,253,528
United States -	16,943	2,752,602
Germany - -	5,122	1,305,372
France - -	15,778	1,074,656
Algiers - -	125	4,609
Norway - -	6,993	1,038,927
Italy - -	18,882	1,013,038

	Ships.	Tonnage.
Netherlands	1,925	499,506
Dutch Colonies	880	77,946
Spain	4,514	390,700
Austria	2,970	378,681
Sweden	3,495	369,900
Greece	5,422	334,900
Russia	2,646	230,229
Denmark	2,735	184,407
Turkey	2,200	182,000
Finland	504	162,704
Portugal	817	88,392
Belgium	67	36,149
Brazil	100	20,000
Chili	75	15,870
Peru	90	9,596
Hawai	57	8,197
Tunis	100	4,000

Post Office.—There were forwarded in England—

	Millions of Letters.
In 1840	169
„ 1850	347
„ 1860	564
„ 1865	720
„ 1871	992

If we bring forward England, France, and Austria-Hungary, we can judge of the development of the states from the amount of the exchange of letters:—

In England	1860, 22 letters	1865, 24 letters	per head of the population.
„ France	„ 7·3 „	„ 8·9 „	
„ Austria Hungary	„ 3·6 „	„ 3·6 „	

It is natural that at present the most important postal lines follow the great channels of communication by railroad, and the more important the latter the more so the postal lines also. Formerly the Brenner railroad was the most important postal line of England to India; that position is now occupied by the line of Mont Cenis. The mail from England to India is estimated at 34,000 letters and 101,600 newspapers, apart from the colossal amounts of money that pass by this route. Every post from India to England is reported to bring regularly 42,840 letters and 23,800 newspapers. The most important ocean postal lines are the Cunard lines, the South Atlantic, and the Indian route, and those of the North German Lloyds and Austrian Lloyds, and the Compagnie Générale Transatlantique, the Compagnie des Services Maritimes des Messageries Imperiales, and the Peninsular and Oriental Company's routes. The last-named society represents the heavy sea service, and hitherto every mail taken on board at Southampton has been of 1,000 centners weight.

Raw Produce in the Commerce of the World.:—Produce of the Mineral Kingdom.

Coals.—England has been the first to detect the value of mineral fuels, and to prize them. She is at this time the largest producer and consumer of coal, and it is evident that the most interesting topics of discussion respect-

ing coal, are concentrated now as in former times, principally on England's production and demand. From England was propounded the serious question whether the colossal increase of consumption would not sooner or later exhaust the coal treasures in the earth, a question that long agitated the whole civilised world. We are bound therefore to close attention to the English production of coal on every point of view. If we follow the most recent statistical calculations we obtain a complete picture of the coal production of England, and the prices it has realised, from the work of the Committee appointed by Parliament (upon the motion of Mr. Mundella, who is well known also for his activity in other branches of industrial life), to inquire into the causes of the continuous rise in the price of coals. The Committee assembled on the 24th March 1872, on which day the newspapers recorded a fresh and rather considerable rise in price in the coal mines of the north, namely 3*s.* or 4*s.* per ton, from which an addition of 1*s.* was made to the cost of carriage. The best coals now cost precisely one pound sterling at the pit's mouth. The Committee at that time occupied itself exclusively with statistical statements, which were put before them at their request, by the first of their witnesses, Mr. Meade, a registrar of the Mining Office. It appeared from his communications that 107 millions of tons of coal were produced in the United Kingdom in the year 1866, 103 millions in 1868, 107 millions in 1869, 110 millions in 1870, 117 millions in 1871, and 120 millions in 1872. There were 3,358 coal mines at work in 1867, 2,922 in 1868, 2852 in 1869, 2851 in 1870, and 2810 in 1871, and in 1872 certainly considerably more, because an exceptional number of new coal deposits were discovered during that year. The coal deposits are for the most part situated in England; Ireland delivers only 125,000 tons a year. In Staffordshire and Worcestershire (the "Black Country") there are 423 coal mines, in Lancashire 376, in Northumberland 304, in South Wales 299, in Scotland 420, in Ireland 30. The export of coals amounted to 10·5 millions of tons in the year 1867, to 10·9 millions in 1868, to 10·7 millions in 1869, to 11·7 millions in 1870, to 12·7 millions in 1871, and to 13·2 millions of tons in 1872. The largest consumers of coals in the country are the iron works, which consumed in 1871 38,539,000 tons. For general manufacturing purposes there were consumed in 1870, 79,170,000 tons, and 17,512,000 tons for domestic use, which is equal to 14 centners per head of the population. Excepting for the manufacture of gas, the consumption of coal has not materially increased since 1867. In 1872, London consumed 7½ millions of tons, of which 5 millions were imported by rail, and 2½ millions by shipping.

These were the explanations afforded by a very experienced man, and they contain a characteristic illustration of the state of the coal question in England. They do not lead us to regard the position of England with any degree of alarm, the less that commerce is always bringing more and more together the widely separated coal deposits of the world and connecting them with the consuming countries, moreover it is not possible for the consumption to increase at the same progressive rate. There is a process of satiation in all things which sets a limit to the increase of demand.

From the most recent calculations it appears that the extent of the coal deposits

In Great Britain -	covers -	9,000	English square miles.	
„ France - -	„ -	1,800	„	„
„ Germany - -	„ -	3,600	„	„
„ Belgium - -	„ -	900	„	„
„ India - -	„ -	1,600	„	„
„ United States -	„ -	220,000	„	„
„ British North America	„ -	2,000	„	„

In China we are informed that there exists in the province Schami a coal deposit of 83,000 English square miles. The coal treasures of Australia have not yet been calculated but their production already amounts to a million tons, which is about double that of the great coal seams of India, China, and Japan.

The entire produce of the coal mines of Europe amounted in the year 1871 :—

	Tons.
In Great Britain - - -	to 117,431,000
„ Prussia - - - -	„ 34,984,000
„ rest of Germany - - -	„ 3,433,000
„ Belgium - - - -	„ 13,733,000
„ France - - - -	„ 12,804,000
„ Austria - - - -	„ 8,375,000
„ Spain - - - -	„ 494,000
„ Russia - - - -	„ 461,000
„ Italy - - - -	„ 47,000
„ Sweden - - - -	„ 30,000
„ Netherlands - - -	„ 25,000
„ Portugal - - -	„ 15,000
„ Switzerland - - -	„ 12,000
„ Denmark - - -	„ 3,000
	Total 191,747,000

America produced in the same year nearly 38,000,000 of tons. In the four coal containing quarters of the world the produce of coal may be calculated for the year 1871 at (more or less) 235,000,000 of tons; or 4,700 millions of centners, which, calculating the price per centner at the low average of 50 kreutzers, represents a value of 2,350 millions of Austrian guldens.

England, as the tabular statement shows, in spite of her own colossal consumption, still assumes the leading place as exporter. In addition to the consumption of her own manufactures she supplies as her chief consumer the German Customs Federation, which imported 17,897,894 centners in 1862, 26,062,248 centners in 1867, and 47,091,441 centners in 1871. The second great consumer of English coal is Sweden, which imported more than 20,000,000 of centners in 1870, but in 1871, in consequence of a falling off in her iron industry, only 16,000,000. The United States of North America took 8,871,000 centners in 1870 ; 9,812,620 in 1871. The demand for the countries washed by the Mediterranean and for the East Indies is considerable; so that we see the English coal trade engaged in a process of steady increase, the invoice value of English coals in 1870 amounting to 70,000,000 of thalers.

Iron.—It is an old observation that the development of the iron industry keeps pace with the increase of the production of coal. The coal production itself consumes a quantity of iron in the form of machinery. To this accrues the increase of railroads ; the marine traffic, much increased of recent years by the opening of the Suez canal and the rapid growth of the trade with North America, demanding the exchange of the small cargo ships for large steamers; and the change in the mode of construction of houses in which wood is constantly more and more replaced by iron: a relation that will be permanent because the price of timber is perpetually rising. Add to the above causes the world's demand for steam engines for manufacturing purposes, the thousandfold quantities of tools and implements, and the whole represents a formidable consumption of iron which is best illustrated by the colossal development of the production.

Here also again it is England that takes the leading part. And although the iron industry of America has grown to be considerable and is developing rapidly, yet she stands below England, only working for her own consumption and not satisfying that, while England is supplying the whole of the world with iron. In fact, her production is not to be mentioned in comparison with that of England, and for this reason we purpose in this place to devote our attention principally to the English iron industry. But we ask leave to make the following observation :—the years last passed with their enormous con-

sumption of iron have forced the iron markets into the most abnormal condition. Great as the increase of the production was, it was insufficient to satisfy the demand. And while prices went up by great amounts at a time the producer had no opportunity to reap the advantages of his position. A reaction has already set in, which, although it may possibly not be of long duration, will yet suffice to bring system and order into the consumption. For the sake of this remark alone, we allude to the temporary condition of the market.

Stimulated by the increased prices, the supply of iron throughout Great Britain was increased in the years last past by 50 per cent. It amounted to 11,000,000 tons in 1869, to 14,000,000 tons in 1870, and to 16,334,880 tons in 1871. But the production of iron has not increased proportionably to these figures; because, under the influence of the high prices, a great deal of ironstone of inferior quality, which was formerly not marketable, came into manufacture. Simultaneously there was an increase in the importation of iron ore, chiefly from Spain. This amounted to 374 tons in 1856, but in 1871 to 23,000 tons.

England's production of raw iron in 1871 amounted to 6,627,479 tons. In spite of the great increase in the quantity of iron ore smelted in 1872 the increase of the quantity of iron produced has been small, which is attributable, as we have pointed out above, to the inferior quality of the ore. Complete statistical data of the whole production of raw iron in 1872 are not yet compiled, but it is known that in the two chief districts of Scotland, and in Cleveland a falling off in quantity from the productions of previous years has taken place. The annual production of Scotland amounted to 1,150,000 tons in 1869, to 1,206,000 tons in 1870, to 1,160,000 tons in 1871, and to 1,090,000 tons in 1872, that of Cleveland to 1,460,000 tons in 1869, 1,695,000 tons in 1870, to 1,818,000 tons in 1871, and to 1,969,000 tons in 1872. The increase remarked in 1870 over 1869, which is about 11 per cent., has fallen in 1872 over 1871 to about three per cent. All this time the export was increasing more rapidly than the production, and throughout the United Kingdom, it amounted—

To 2,825,575 tons of iron, of the value of 22,038,000 pounds sterling, in 1870; to 3,169,219 tons, of the value of 26,124,134*l.*, in 1871; and to 3,388,622 tons, of the value of 36,060,547*l.*, in 1872. The export of iron rails in 1871 amounted to 981,197 tons, of the value of 8,084,619*l.* sterling; and in 1872 to 479,548 tons, of the value of 10,237,768*l.* sterling.

We see therefore that Great Britain exported in 1872 about 12 millions of pounds sterling more in value although the quantity exported did not increase by more than 200,000 tons. So rapid was the rise of prices.

This increase of export and of home consumption together has exhausted the stock in hand, and it is now quite inconsiderable, so that it cannot supply any further demands upon it. The stock in Scotland on 31st December 1869 was 620,000 tons, 1870 it was 605,000 tons, 1871 490,000 tons, 1872 194,000 tons. The stock in Cleveland 31st December 1869 was *115,600* tons, 1870 117,345 tons, 1871 68,331 tons, 1872 41,628 tons, and early in 1873 the combined stock of both places was scarcely 100,000 tons. And this is not only the case in England but also in Sweden, in Germany, and all iron producing countries, and it naturally has a great influence on the continued increase of prices. The highest rise that was caused by it was that in North America, but in consequence of the heavy protective duties prevailing in that country its market has happily little or no influence on those of Europe. If we take into consideration the prices, as they have ranged during the last few years, we shall perceive that they have been regulated only by the enormous demand for consumption, and the rapidity of their rise could not hinder the exhaustion of the stocks of the great markets as we have shown above, for while a rise of prices in former times of 10 or 20 per cent. was enough to set a close limit on consumption, in this case a rise of a hundred per cent. has been inadequate to produce any detrimental effect on the use of iron. On the greatest iron market of the world, that of England, the prices for Scotch raw iron vacillated as follows: average prices per ton in *1869, 57s. 9d.*; in *1870, 51s. 3d.*; in *1871, 73s.*;

in 1872, 121*s*. Against these conditions, as we have learned to know them from England, the iron production of the rest of Europe is insignificant, and the consumption of iron must necessarily be always regulated by the conditions existing in England.

Vegetable Produce, &c.

Cotton.—Of the produce of the year 1872, amounting to 6,956,000 bales, Europe received more than 5 millions of bales, and England more than two-thirds of this importation.

The soil of India, so highly favoured by nature, has since the mighty impulse of competition of America again reduced the extent of its cotton cultivation and production. But England devotes the greatest care and attention to the Indian cotton, and has learnt from the experience of past years the necessity of maintaining her independence of America. Of the million and a half centners of Indian cotton consumed by Europe in 1872 more than the half went to England. What India is for England Egypt may become for Central Europe, and especially for Austria. We append a tabular statement of the Egyptian cultivation or export of cotton to prove how rapidly the production is increasing, and how capable it is of rendering Central Europe independent of England and English imports and intermediate trade.

(The table from 1821 with 944 centners, shows a continuous increase to 1872 with 2,108,500 centners, and 1873 ending April with 2,013,433 centners.)

England imported in 1871 altogether 4,405,420 bales of cotton, of which more than 2·2 millions were supplied from America. England requires to keep her cotton spindles in full activity 2,964,000 bales a year, that is, rather more than 9,166 bales daily. The surplus of her imports is given off to the continental states, which also, as we have mentioned before, are making great efforts to overthrow the supremacy of the English intermediate trade. The struggle may now already be considered happily decided for the continent. It is true that the whole produce of English manufactures in cotton is still (in 1871) of the value of 1,022 millions of guldens, of which she only consumes a value of 156 millions at home; the remainder is sent abroad and England receives payment for it. The value of the production of cotton goods by the whole of the rest of the world, bears precisely the same proportion to that of England that the whole of the spindles of Europe bear to the 39½ millions from year's end to year's end incessantly active in England.

Wool.—It is now a recognised fact that the whole wool production of Europe, whether cultivated with great care or fed on the broad steppes which are fit for good pasture grounds, and left to natural laws of breeding, is completely superseded by the enormous abundance of the wool of Australia, the Cape Colonies, and La Plata. In fact for the bulk of common sorts of wool there is no longer a remunerative market, and the position and incomes of many undertakings in this branch of industry are considerably changed by the circumstance. Wool is distinct from most agricultural produce in the facility with which it can be transported. Further if it is preserved with any degree of care it is almost imperishable, and as the price of it on an average is 20 or 25 times as high as that of cereals, it is adapted to a transport of 20 or 25 times the distance. From all this it is easy for the most remote countries of the world to compete in the production of wool, and thus the wool trade has become an integral part of the "commerce of the world." The cost of transport being so small in proportion to the price, it is only countries thinly populated like Australia, &c., where the rent of land from that circumstance is low, who are able to bring their wools to market at low prices. By this colossal and ever increasing importation from countries trans-oceanic, prices of wool have been so considerably depreciated that, principally through the enormous develop-

ment of the manufacture of stuffs, the classes of the population to whom woollen clothes were formerly unattainable are now dressed in them. It is estimated that England now annually consumes more than one fleece for every inhabitant. However, the European production of wool is not yet quite at an end. The fine, long, and clean sorts are still the peculiar property of the Old World, and years of industrious labour must be accomplished before either Australia or the Cape of Good Hope are able to compete with the best, cleanest, and finest European sorts. And even if this should ever be the case, it will certainly still be possible to maintain the cultivation of wool in Europe in some states, but with the greatest care and attention, aiming to improve the quality with the quantity, because the consumption of wool is steadily increasing, and already immense quantities of the so-called artificial wool are brought into use. In Bradford, the principal mart for this article, such quantities are manufactured into all kinds of stuffs that 600,000 clean fleeces are used as a material to be added to the composition of the stuffs that are made there from this perishable "shoddy wool." On the continent also the production and consumption of this kind of wool is steadily increasing.

The general consumption of wool in England is said to amount to 4½ lbs. weight per head of the population. In Germany it is 3·6 lbs.; in Austria 3 lbs. A conjecture can be formed from this of the colossal quantities that Europe can consume.

The whole production of wool of the whole world amounts, according to the estimate of Fr. X. Neumann, to at least 1,250 millions of pounds weight, representing a value of 750 millions of guldens. This is distributed approximately as follows:—Europe, 570 millions of pounds; La Plata, 200 millions; Australia, 190 millions; North America, 155 millions; India, 30 millions; the Cape Colonies, 28 millions; and Canada, 10 millions of pounds weight. The production of Europe for the last three years, which has undergone very little variation, is so distributed that of the total of 570 millions of pounds, there fall in the year 1870 and 1871—to England, 145 millions of pounds; to France, 140 millions; Russia, 130 millions; Germany, 70 millions; and Austria, 52 millions; which, however, does not indicate the consumption of the various countries. To give one example, the average annual quantity imported into Germany in recent years has been 900,000 centners, so that the quantity annually manufactured in Germany can be stated at 1,350,000 centners.

England still stands at the head of the wool producing states, and, in Europe, there is no country but Russia which is capable of still further developing her production of wool in respect both to quantity and quality. In the La Plata States the Argentine Republic takes the lead, with an annual production of 140 millions of pounds; in Australia, Victoria, with an average production of 64 millions of pounds.

England, particularly London, is the central market for the trade in wool. At appointed times wool auctions are held here, to which buyers congregate from all countries. After the season, the markets of all other countries are regulated by the results of these auctions, with such variations only as the local conditions of production and manufacture impose. England being the largest consumer of wool, the fluctuations of the European wool trade have depended on those of the English market from olden times. Spain formerly supplied England with wool, and about the year 1845 her annual import amounted to a million pounds weight. The production and export have now considerably diminished in Spain, and Germany has occupied her place. The export from Germany to England in the beginning of the present century amounted to three millions of pounds weight, but in the year of her largest export, 1836, it reached 31,766,200 pounds! From that date the export diminished year by year as the German manufacture of woollen goods developed. The whole of the export now scarcely reaches 25 million pounds. The only country that has increased her export to England during the last few years is Russia. Its export in bales of 2 cent-

ners and 71 pounds Zollgewicht (Austrian weight) amounted in 1860 to 22,150 bales, but in 1865 had increased to 37,829 bales. There is no doubt that the subject of the greatest importance to the wool trade of the world is at present the importation from Australia, La Plata, and the Cape Colonies. In order not to leave our work imperfect, we are obliged to introduce here the tabular statements taken from the very useful "Economist." We begin with the remark that before 1850 the export of wool from Australia scarcely amounted to half a million pounds; that of the Cape of Good Hope, about 1840, had just reached 100,000 lbs.; that of the La Plata States, on the other hand was rather more than two millions lbs.

Against this, in thousands of bales of 400 lbs., of the wool trade:—

—	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
Australia to England	241	302	332	348	412	491	499	549	567
The Cape to England	68	69	99	107	128	141	134	124	127
La Plata to Europe	81	86	131	152	192	234	234	213	236
India to England -	—	—	—	—	—	4·1	4·9	3·3	—
Canada to England	—	—	—	—	—	—	7	6	—
Totals - -	390	457	562	607	732	870·1	878·9	895·3	930

The commercial movement of the wool trade in the leading states of Europe and the United States of North America for the year 1870 was as follows:—

—	Imports.	Exports.
	lbs.	lbs.
England - - -	238,820,852	94,911,916
France - - - -	167,422,200	25,711,412
Belgium - - -	147,092,128	66,543,920
Germany - - -	90,000,000	25,000,000
Austria - - - -	21,680,900	16,392,700
Netherlands - - -	16,991,972	13,906,260
Russia - - - -	2,648,700	28,558,577
North America - - -	62,202,714	12,067,689

As to the consumption of the most important European states, England, engaged in progressive development, and France stand at the head of the wool manufacture. In the year 1870–71, England manufactured 330 millions and France 300 millions pounds of wool of all descriptions. That gives a total trade movement of more than 1,000 million pounds, or in value about 700 million guldens.

Cereals.—England supported by her mercantile navy imports grain from Europe and all parts of America. Wheat and wheaten flour are the chief

articles of this import, and the consumption of England is estimated at 64 millions of hectolitres. As her own soil, in the best years, is scarcely able to produce two-thirds of this quantity, the remainder is derived from Russia in the first place, then from America. Her imports in 1871 amounted to 39,407,646 centners of wheat, 3,984,638 centners of flour, and 36,428,664 centners of other grain, representing a value of 40 millions of pounds sterling.

Tea.—Adulterations of tea are carried on in the retail trade with used leaves. They are most common in England, where, with a consumption of 3½ lbs. per head of the population, the use of tea is universal even among the poorer classes.

It is unfortunate that in this commerce also, as in respect to cotton, South and Central Europe are almost entirely dependent on England, and pay freight and profit in a price which might be reduced at least one-third by direct importation through the Suez Canal to Trieste or Venice. The Trieste harbour, in spite of the increasing consumption in Austria (about 369,600 lbs. in the year), has not imported one pound. It may possibly be not in vain that we reiterate what the directors of customs from China, who were in Vienna during the Exhibition, frequently assured us to be a fact.

Animal Food.—The utilisation of the enormous herds of cattle existing in Australia, by the manufacture of preserved meat, is carried on at present by joint stock companies, in Rivermen district at Deniliquin, where 10,000 sheep are slaughtered and preserved every week. On the average of the last few years 620,438 horned cattle and 3,758,175 sheep and swine have been annually potted and exported, representing a value of about four millions of francs. The enormous herds of North America are used in a similar manner. The American and Australian exports in all kinds of preserved meats may exceed 40 millions of francs in value. We annex a comparative statement of the stocks of cattle of civilised countries, which will be the best way to illustrate the labour and productive value they represent, and the extraordinary character of the rapid increase of the exports of America and Australia:—

	Horned cattle.	Sheep.	Swine.
EUROPE:			
Russia	20,988,300	43,770,020	9,285,412
Austria-Hungary	13,660,322	16,566,459	7,914,855
Germany	13,487,594	29,633,600	6,108,204
France	12,733,188	30,386,233	5,889,624
Great Britain	9,083,416	34,250,272	3,189,167
Italy	3,708,635	11,040,339	3,886,731
Rumania	2,650,000	5,000,000	1,200,800
Sweden	1,968,000	1,595,000	354,500
Spain	1,869,178	22,054,967	1,608,203
Netherlands	1,347,752	900,187	329,058
Belgium	1,257,649	583,485	458,418
Switzerland	992,895	445,400	263,546
Portugal	606,217	257,770	934,880
Greece	75,910	1,778,729	55,776
AUSTRALIA:			
Victoria	689,536	9,923,660	111,464
New Zealand	436,592	9,700,629	151,460
New South Wales	1,728,073	13,909,574	92,800
Queensland	882,073	5,665,334	12,066
AMERICA:			
United States of North America	26,235,200	31,851,000	29,457,500

These enormous herds of cattle—which are far from being all included in the return of Australia, because the herds at liberty have not been estimated, and to that of America are still to be added the enormous numbers existing in the unnamed states of that continent—feed a cattle trade not to Europe

only but also to trans-oceanic countries which has now existed for many years, although in the treatment of the cattle, and the preservation of the meat upon the journey, they have still much to learn. Time will compel Europe also to improve its arrangements for transport.

Movement of the Commerce of the World.

We give the figures relating to the separate states only for Europe, and for the details of the other quarters of the world of which we only state the totals, we refer our readers to "Behm's Geographical Year Book."

	Imports.	Exports.	Totals in millions of Austrian florins.
Europe:			
England and Ireland	3,300,600,000	2,215,100,000	5,515·7
France	1,137,100,000	1,346,100,000	2,483·2
Germany	870,000,000	765,000,000	1,635
Belgium	698,500,000	603,900,000	1,302·4
Russia	510,900,000	569,500,000	1,080·4
Austria-Hungary	532,700,000	470,800,000	1,003·5
Netherlands	556,500,000	458,500,000	1,015
Italy	395,500,000	339,500,000	735
Spain	187,100,000	121,300,000	308·4
Turkey	126,700,000	55,200,000	181·9
Sweden	81,300,000	87,500,000	168·8
Denmark	90,090,000	46,700,000	136·7
Norway	53,880,000	44,100,000	97·9
Portugal	22,300,000	19,700,000	42
Rumania	28,700,000	62,800,000	91·5
Greece	32,100,000	18,000,000	50·1
Servia	10,600,000	13,500,000	2·1
Total for Europe	8,634,400,000	7,118,200,000	15,752·6
America:			
The United States	1,120,900,000	1,164,400,000	2,285·3
Other States of America	894,700,000	1,008,300,000	1,903
Asia:			
British India	468,800,000	535,100,000	1,003·9
China	258,800,000	247,100,000	505·9
Japan	53,800,000	25,100,000	78·9
Other states of Asia	242,300,000	265,200,000	507·5
Australia:			
The whole	298,400,000	297,000,000	595·4
Africa:			
Egypt	41,400,000	115,800,000	157·2
Other states	158,200,000	121,700,000	279·9

These statements show that the whole commerce of the world amounts to about 23,200 millions of Austrian guldens.

THE "CIRCULATING MEDIUM."

(Prepared by authority of the Imperial Austrian Commission.)

One independent influence has been acting for centuries upon the demand for money coined from the precious metals, and therewith upon money itself. The regular exportation of European gold and silver to India and Eastern Asia has become an indispensable condition for supplying the necessities of life. This movement of the stream of gold is divisible into three great periods, which may be distinguished according to the localities over which they extended: for antiquity, the period of Alexandria and her universal trade; for the Middle Ages the period of Venetian commerce; and for the present generation, in which the efflux still continues, the period of England and her supremacy in the commerce of the world. The export of gold and silver from Alexandria and Venice was made, and that from London is made at the present time, in compensation for an importation of raw produce and goods, which has remained almost identical in substance for a thousand years. And this export is destined to continue, so long as we are not in a position to give our iron rails, our machinery, and our manufactures, our appliances for educational purposes, &c., in exchange for the tea and silk to the Chinese, and for cotton, dyes, fine fabrics, &c., to India. It is, however, already perceptible in the very variable statistics of the exports of the precious metals, that a change is gradually coming on in the requirements of the Asiatic peoples, and that it is no longer the precious metals alone, but also European manufactures, which are sent out as counterpoise to the stream of Asiatic wares into Europe. In order to illustrate this we give the amounts of the exports in precious metals to the East. They amounted in average:—

	Thalers, gold.	Thalers, silver.
Of the years 1861 to	1865 to 32,220,000	and 86,930,400
But in the year	1866 to 19,142,000	„ 47,197,000
And „	1867 to 9,994,000	„ 18,682,000
„ „	1868 to 43,521,000	„ 27,724,000
„ „	1869 to 17,509,000	„ 43,761,000
„ „	1870 to 13,912,000	„ 14,880,000

The average, therefore, of the annual exports of the last 10 years has not exceeded 20,815,600 thalers gold, and 28,648,800 thalers silver. It is true that when we consider the above statistics we perceive the absorption of a very great proportion of the whole production of precious metals, which passes through Great Britain. The import of gold registered in the Custom House of England, amounted in the year 1871 to 21·6 millions of pounds sterling, and that of silver in the same year to 16·5 millions sterling. It will be easy to understand that the change recorded in the statistics given above, showing principally a considerable reduction in the exports of silver, had a favourable effect on the price of the precious metals, which is very exhaustively shown in the careful treatise of Adolf Soetbeer. The gradual introduction of a gold currency into the whole of Europe may also react upon this, and in any case raise the price of gold.

The quantities of the money exported, principally by way of England, to India and China, where they lie for the most part buried and dead, seriously increase the demand for the precious metals in civilised countries, and keep down the supply; moreover, the advance of European civilisation among peoples and States from which it has been hitherto excluded produces an alteration in their economy (which as a new element of civilisation constantly calls for gold and supersedes the life of nature, producing a similar effect by increasing requirements). It can therefore be assumed with certainty that no conceivable extent of production of the precious metals would ever bring to pass an accumulation of them or a serious depreciation of their value.

(p. 43.) The value and productiveness of the Californian gold mines, the extent of which is given in the above tables have long been steadily declining. Against this new and rich sources of gold production have been discovered by the opening of the gold deposits of New Zealand and Victoria. These English colonies have contributed to the supplies of gold, as illus-

trated by England in a pyramid of gold in the Exhibition of 1867, the sum of 937,859,350 thalers in 15 years. These productive deposits, however, have during the last five years, become more difficult of access than they formerly were, and the production and supply have for some time been falling off. But in 1871 the amount produced was again so considerable that the study of the official mining statistics may be very useful, and the facts there given may furnish fresh hopes after long disappointment. The cause of this increase in the produce lies in the gradual completion of the railroad reticulation now traversing the English colonies and connecting the gold diggings with each other and the great towns.

In the colony of New South Wales, founded on the 26th January 1788, and now containing 512,000 colonists, are about 304 English miles of railroad running to the west, north, and south of the colony, the main artery of which is Sydney, the capital town of the colony, where the line debouches upon the celebrated port, "Port Jackson." The construction of the railways has led to the formation of joint stock companies with large capital, at present very much wanted for the gold mining, which has gradually grown systematic and scientific. The alluvial diggings having long ago been impoverished, the auriferous quartz has now to be treated, and the poor digger not being able to deal with that an establishment adequately supported by capital is required. The gold fields of the colony of New South Wales are divisible into three groups: the western, the northern, and the southern. The following table indicates the separate gold deposits of the three great districts and the amount of their produce in gold in the three last years :—

1. Western Gold Fields.

	1869.	1870.	1872.
	ozs.	ozs.	ozs.
Sofala	15,779	12,903	12,153
Bathurst	15,816	27,579	8,575
Hargraves	4,388	3,753	4,512
Tambaroora	17,567	18,699	42,073
Mudgee	20,177	19,967	37,654
Orange	10,431	6,078	9,257
Stony Creek	3,669	3,424	3,105
Forbes	2,583	—	—
Grenfell	41,543	36,231	21,979
Carcoar and Turnkey	—	—	20,103
Totals	131,953	128,634	159,411

2.—Southern Gold Fields.

	1869.	1870.	1871.
	ozs.	ozs.	ozs.
Goulburn	540	350	3,592
Braidwood	11,170	12,412	20,665
Adelong	12,368	10,772	13,826
Tumut	171	—	2,523
Tumberumba and Wagga	1,310	1,213	14,696
Araluen	38,824	17,309	17,638
Burrangong	8,400	6,974	6,285
Cooma	2,536	1,261	528
Kiandra	2,420	1,651	1,812
Gundagai	2,849	3,814	2,697
Totals	80,590	55,756	73,262

3.—Northern Gold Fields.

	1869.	1870.	1871.
	ozs.	ozs.	ozs.
Rocky Rivers - - -	2,784	3,122	2,050
Nundle - - - -	5,905	6,347	7,239
Tamworth - - -	950	1,309	1,395
Scone - - - -	521	—	—
Armidale - - -	2,728	3,494	3,587
Totals - -	12,888	14,272	14,271

The value of the gold varies at the different diggings. The highest price is 3*l.* 19*s.* 5*d.* per ounce, the price of the Tambaroora gold (western fields). Goulburn (southern fields), is also sold at 3*l.* 19*s.* 5*d.*, and Rocky River (northern fields), at 3*l.* 18*s.* 10*d.* The lowest in value is the Tumberumba gold, which at the moment only produces 3*l.* 10*s.* 8*d.* per ounce.

For the purpose of comparison, a statement of the gold produce of the years 1860 to 1869 may be added:—

	Ounces.		Ounces.
1860 - -	356,572	1865 - -	280,810
1861 - -	402,634	1866 - -	241,489
1862 - -	575,538	1867 - -	222,715
1863 - -	423,407	1868 - -	229,739
1864 - -	316,430	1869 - -	224,382

It appears from these tabular statements that the produce of the gold fields of the colony of New South Wales has been continually declining in amount from 1862 to 1870; but that in 1871 a considerable advance on the preceding year was realised. This was the effect of the richly auriferous quartz reefs discovered in the western gold fields Tambaroora and Turnkey, and it is expected that the results to be presently obtained will be still more successful. It has been announced officially that the produce of the month of January 1872 amounted to 22,295 ounces as against 19,569 in the same month of the previous year, which was distributed among the separate groups as follows:—

	Western Gold Fields.	Southern.	Northern.
	ozs.	ozs.	ozs.
1871 - - - -	10,409	7,788	1,372
1872 - - - - -	14,134	7,257	904

The Tambaroora gold field, judged from the results it has already produced, appears to be the richest quartz district of Australia, and every square foot of land is already occupied by a claim. A great number of companies,—nearly a hundred—have been recently formed there for the purpose of working the reef, and although months may yet have to elapse before these become productive, yet in the judgment of competent persons who have carefully inspected the district an extraordinary degree of success may be anticipated.

Of still greater importance are the Australian gold fields of Victoria. They were opened up in the year 1851, and form the most celebrated gold fields of the world now that California has ceased to be productive. We have before us now the official report of the total of the produce of the goldfields of Victoria for the year 1871. It is based upon the returns of exportation,

and if such a calculation is not absolutely accurate, for example, in excluding the amount of gold manufactured in the colony, yet it is approximately the most accurate that it is possible to make. Since the repeal of the duty on the export of gold from Victoria, no inducement for concealment or falsification of the returns has existed. We gather then from this report that during the year 1871 altogether 1,355,477 ounces of gold were exported from the colony. But as the various banks had a stock in hand on 31st December 1870 amounting to 212,458 ounces, but on the 31st December 1871, of, only 162,360 ounces, the actual production of the year is brought down to 1,303,379 ounces. Estimating the ounce of gold at 4*l.* sterling (it varies in Melbourne from 3*l.* 18*s.* to 3*l.* 19*s.*), this would yield the amount of 5,213,516*l.* sterling, or, calculating the pound sterling at 6 thalers and 22 silver groschen, 35,104,341 thalers.

The number of the diggers engaged at the gold-fields of the colony of Victoria in 1871 averaged 58,101. In the first quarter of the year it was 58,220, in the second 57,439, in the third 58,506, in the last 58,241. Making a partition of the produce stated above, we have an average yield of 1*l.* 14*s.* 6*d.* per man per week, or 11 thalers and 18 silver groschen—a modest rate of earning for Australian circumstances.

For the sake of comparison we may add the statistics of the previous recent years :—

Year.	Number of diggers.	Years produce.	Average per man per week.
		ozs.	£ s. d.
1868	63,121	1,474,187	1 16 0
1869	68,037	1,367,903	1 11 0
1870	60,367	1,281,841	1 12 0

MEANS OF PUBLIC EDUCATION.—J. LOWENTHAL.

ENGLAND.

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If England's efforts to promote education were judged only by the Exhibition in Group XXVI. of the "Weltausstellung," we should have a difficulty in deciding upon the rank among nations that it would be proper to assign to her. With the exception of a few scientific and educational works in the German and French languages; a few articles of school furniture, such as the collection of books of the British and Foreign Bible Society; the Journals and tracts of the Religious Tract Society, in all European, Indian, North American-Indian, and African languages; and finally the maps, books, and other objects for use in Sunday schools exhibited by the Sunday School Union, there was scarcely anything to be discovered suggesting its origin from a country which is entitled in all respects to pass for a model State; whose achievements often fill us with admiration, and in whose colonies the greatest possible regard is certainly paid to educational requirements. In Melbourne, the capital of the British colony of Victoria in Australia, for example, there is a library, erected at the cost of the State, which contains more than 70,000 volumes, and yearly adds to their number. In that place museums, national galleries, and mechanics' institutes are created for the instruction of adults; and the schools, of which in the year 1870 there were more than 900, can bear comparison with the best in Europe; and this is as true in reference to the lower as to the higher classes of educational establishments. British India contributed largely to this group, the forethought of the Local Committees of Bombay, Madras, Bengal, the Punjaub, Mysore, Burmah, Berar

Hyderabad, Indore, and other places having supplied the most interesting literary and graphic productions. Amongst these we found maps, globes, architectural and geometrical designs, educational works in the English and Hindoo tongues, Sanscrit classics for the use of the high schools and gymnasia; the "Bibliotheca Indica;" newspapers in the Arabic and Indian languages, with a variety of other periodicals.

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CONTRIBUTIONS TO THE HISTORY OF PRICES.

Report of Dr. C. Theodor v. Inama-Sternegg, *Professor of Political Science at the University of Innsbruck.*

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We were not able to discover anything from England, the classical home of historians of prices, excepting an old work contributed by Miss Boase of Edinburgh, "A century of banking in Dundee; being the annual balance sheets of the Dundee Banking Company from 1764 to 1864, second edition, 1867;" and a statistical table of tea, by J. C. Sillar and Company, brokers. The table which gave the London tea prices from 1836 to 1870 was supplemented by historical notices on the consumption of tea from 1610 to the present date, and by the reference of statistics of quantity to those of price it cannot be denied that some useful service was rendered. The celebrated work of Rogers, "The History of Agriculture and Prices of England" of which only two volumes, bringing us down to the year 1400, have at present been issued, is indirectly introduced into the Exhibition in the works of Professor Laspeyres of Carlsruhe, this savant having graphically illustrated the principal results of the calculations given therein. But how meritorious, and how well worthy of a Universal Exhibition would it have been if England, from the important and plentiful sources of her history of prices, from which all compilers have drawn material for their work, had brought forward something in the original from the Eton and Oxford tables—*i.e.* from 1595 and 1583 respectively—down to the official register of 1770, in the possession of which England far excels all other countries in her store of reliable materials for forming data of prices, and which are further carried back up to the year 1401 by the notes in F. Eden's State of the Poor (1797).

The graphic representation of English prices of labour and commodities in the 14th century is intended to show, by a very striking example, the great uses that can be derived from a collection of prices dating from the records of past years. The tables illustrate the violent convulsion in prices caused in England by the pest (the black death) in the middle of the 14th century. The data for this illustration are drawn from the two volumes of the work of Rogers that we have already mentioned. The compiler has selected the same mode of representation by relative numbers as is used in the Hamburg prices of commodities, but he has only set the average price of a whole decade for his standard, and has chosen a period of forty years, from 1261 to 1300, as a starting point for his comparison.

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STATISTICS.

J. Lowenthal.

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England.

The British Commission has published, for the guidance of the exhibitors, in the Austrian tariff of import duties upon the principal articles of British produce and manufactures, and has added to it a tabular view of the

agricultural and manufactured productions exported to Austrian ports in the year 1871. The aggregate value of these is calculated at 1,558,352*l.* sterling. We would observe that this amount represents only a fraction of the goods brought into Austria from England, because many of them are forwarded by way of the northern and western ports of shipment into Austria, and appear under the heading of exports to Bremen, Hamburg, Antwerp, Rotterdam, and so on. Further, the above data do not agree with our own returns, as 37,911,094 florins is given as the value of the cargoes received from England in the year 1871 at Trieste alone. If we take into calculation, in addition to this, the export from Trieste to England, at 9,837,095 florins, the traffic between Austria and the British kingdom appears of far greater importance than it would be taken to be from the data of the "Austrian tariff."

The British Section offered us besides this no basis for arriving at more recent statistical facts. The official catalogue was limited to the customary record of names and a few good plans and illustrations; but it contained in the last pages some notes upon the commercial and industrial conditions existing in the British colonies, which, being not much known, have certainly a claim upon our attention. The area of the colony of Victoria, south-east of the the Australian continent, is given at 86,831 English square miles. Australia containing about 3,000,000 square miles, Victoria therefore forms one-thirty-fourth part of its superficies, and is only a little less than the British kingdom without its adjacent islands. Victoria produced in the year 1870, 5,697,056 bushels of wheat, and the export of wool in the year 1871 amounted to 76,334,480 pounds. The colony of Victoria, thanks to its geographical situation, enjoys a climate far better adapted to Europeans than any other Australian colony. Its mines contain a mineral wealth as great as it is varied. Native copper, silver, tin, zinc, lead and iron, yield an important amount of wealth. The diggings on the alluvial fields are no longer productive of gold, but the gold quartz reefs are still being actively worked. From the first discovery of the gold deposit (1851) up to the end of the year 1871 gold has been obtained to the extent of 40,749,848 ounces, of the value of 162,699,322*l.* sterling. Victoria possesses 330 English miles of railways in full activity of traffic. The cattle of the colony in the year 1870 numbered 161,530 horses, 179,661 milch cows, 512,857 beasts, 9,923,660 sheep, and 11,464 swine.

So far we are informed by the statements in the catalogue, which we will complete with the remark that in many parts of the colony a great number of manufactories are established, producing cloth, woollen goods, paper, cigars, soap, and candles, and there are some iron foundries. Great success has attended the export, for about five years, of preserved meat to Europe, but the staple of export is wool. The colony has sent a rich collection of her produce to the Exhibition. In this are found, silk cocoons, ostrich feathers, quartz, preserved meat, photographic views, meal of Indian corn, wines, olives, chestnuts, figs, pharmaceutical preparations from the Australian flora, wheat, fur collars and muffs, quartz with antimony, merino wools, calf skin leather, weapons, and arrowroot. Melbourne has taken a prominent part in these consignments. Founded in the year 1835, this city continually increases in the characteristics of a great town, and has no need to shun comparison with the finest and most important of European cities. The colony of New Zealand, consisting of two large islands and a few chiefly uninhabited smaller ones, contained, according to the last census of February 1871, 256,393 inhabitants, exclusive of the natives, as against 99,021 in 1861. The revenues increased in the same period in due proportion from 691,464 to 1,342,116 pounds sterling. The population of the larger towns in the year 1871, taken in round numbers, was as follows:—Wellington, the seat of the general government, 80,000; Dunedin, 20,000; Auckland, 20,000; Christchurch, 12,000; Nelson, 6,000.

The public debt of New Zealand in 1871 amounted to 9,983,341 pounds sterling. The commercial traffic increases from year to year. It amounted—

		Imports.		Exports.
In the year	1860	to the value of 1,548,333*l.*	and	586,953*l.*
„	1870	„ „ 4,639,015*l.*	„	4,822,756*l.*
„	1871	„ „ 4,078,192*l.*	„	5,282,084*l.*

The production of butter and cheese increased as follows:—Butter, from 3,834,255 pounds in the year 1867 to 5,199,072 in 1871; and cheese from 1,300,082 to 2,547,507 pounds at the same dates. The increase of the stock of cattle was also remarkable. There were:—

In 1867, horses,	65,615,	and in	1871,	81,078
„ beasts,	312,835	„	„	436,592
„ sheep,	8,418,570	„	„	9,700,629
„ wines,	115,104	„	„	151,460

Immigration brought in 1870, 9,124 persons, including 4,015 from Great Britain and Ireland, and 456 from other States, the rest came from the Australian colonies. The import trade embraces nearly all the branches of European manufacture, viz., cotton, woollen, and silk goods, beer, wine, and sugar. The exports consist chiefly in gold, kauri gum, wool, copper, flax, lead, sulphur, and timber. The most important exports are still gold and wool. The former, in the year 1870, was of the value of 2,157,585*l.* sterling; and the latter 37,039,763 pounds weight against 27,765,630 pounds in the year 1869. New Zealand contributed to the Universal Exhibition, alluvial gold, bars of gold and silver, timber, iron sandstone, flax, preserved meats, gums, oats, specimens of woods, coals, collars and muffs, an assortment of ores, quartz, silk, jewellery, birds, leather, tobacco, cigars, photographs.

The island of Ceylon, although it has been completely in possession of the British Government since 1815, is not yet cultivated over a tenth part of its area. The population amounted to 2,198,884 souls in the year 1871. The State revenue was 1,121,679*l.*, the expenditure 1,064,184*l.*; the value of the imports was 4,797,952*l.*, and that of the exports 3,634,853*l.* sterling. The pearl-fisheries, formerly very productive, have been abandoned. Jewellery is for the most part manufactured in the island. The Exhibition contains earrings, finger rings, silver chains, and other articles in use among both sexes.

The island of Mauritius, held by the English since 1810, which lies in the Indian Ocean 400 English miles to the east of Madagascar, numbered 318,584 inhabitants in the year 1870. Of these 217,742 were Indians. The State revenue was 616,952*l.*, the expenditure 601,961*l.* sterling. The principal produce is the sugar cane, the cultivation of which employs from sixty to seventy thousand immigrants from the Indian presidencies. The value of the imports and exports respectively, exclusive of gold, was 1,807,382*l.* and 3,053,054*l.* The export of sugar alone appears in the statement to have amounted to 2,819,944*l.* sterling. The principal objects sent to the Universal Exhibition were samples of sugar, raw silk, mats, flax, tow, and various earthenware vessels.

The official catalogue further remarks that the most recent particulars about British India have not yet come to hand, and we add here some less generally known statements on the subject of the British settlements in Western Africa, as Sierra Leone, the Gold Coast, Gambia, and Lagos. The revenue of these settlements amounted in the year 1871, to 172,197*l.*; the expenditure to 167,497*l.* The value of the imports was 1,050,237*l.*, that of the exports 1,505,864*l.* sterling. This traffic was performed by 1,271 ships of 419,828 tons burden for the imports, and 1,210 ships of 403,575 tons for the exports. Since that date the Dutch possessions in Guinea have been incorporated with the British colonies. It may therefore be assumed that in the year 1873 the exports of the British settlements in West Africa will have exceeded two millions sterling, and that the imports will have amounted to 1,500,000*l.* The principal article of export is gold dust, which figured in the Universal Exhibition in company with some remarkable productions of native industry, such as monkey skins, tobacco pipes, sandals, wallets, and the like.

The island of Jamaica, according to the census taken in June 1871, contained 13,101 white, 190,316 coloured, and 392,707 black inhabitants, or a total of 506,154 souls. Tobacco, of which there were samples in the Exhibition, may be mentioned as a comparatively new produce, in addition to the principal articles of export, sugar, rum, coffee, spices and cocoa nuts. The plantations, begun about four years ago, are situated about 15 English miles from the capital city of Kingston, and yield a leaf resembling that of Havannah. About 100 persons are employed in Kingston in the preparation of cigars and

cigarettes. The freight per mille from Jamaica to England is 3*s.*, to the Continent of Europe, 3*s.* 6*d.*

The Bahamas, which are made up of a group of twenty inhabited islands and an innumerable quantity of smaller islands and rocks, the capital town of which is Nassau, were also present in the Universal Exhibition, exhibiting, amongst other objects, shell work, ornaments made from the scales of fishes, pisangs, bananas, pine apples, cordage, sponges, timber, corks, feathers of the flamingo, cigars, &c.

The island of Trinidad, to the south-east of Venezuela, had 109,683 inhabitants in the year 1871. The specimens of its produce sent to the Exhibition consisted principally of sugar, rum, cocoa, coffee, tar, and various species of timber.

China.

A graphic table in the "Cercle Oriental" showed us that the mercantile carrying trade of China under foreign flags was, in 1871, almost equally shared by British and American vessels, after which came those of Germany and of sundry other nationalities. On the whole, it engaged 8,200 steamers of 5,630,000 tons aggregate burden; and 6,500 sailing ships carrying 1,800,000 tons. The value of the foreign trade of China in 1870 was 73,000,000 taels import, and 62,000,000 taels export. Of the imports England's share was 27,000,000 taels, that of Hong-Hong 21,000,000 taels, of India 20,000,000 taels; and the remainder fell to the North American States, Singapore, Japan, and the States of the European continent. The most important export was also to England, amounting in the year 1870 to the value of 32,000,000 taels; Hong-Kong again takes the second place with 11,000,000; then follow the United States, the continent of Europe, Japan, Singapore, and finally, India.

British India.

Two tables in the "Cercle Oriental" display at a glance the commercial transactions of British India from the year 1835 to 1871. The shipping list has increased from year to year, the arrivals in 1854 being 1,900, and in 1870, 5,600 vessels, and during the same period the tonnage has increased in proportion from 900,000 to 2,000,000 tons. Of this shipping the kingdom of Great Britain supplied, in the year 1870, 4,900 ships of 1,700,000 tons. Of other flags, that of North America was the most active, and next to it the French and the German. The frequency of the last-named has not increased of recent years. The entire commercial traffic of India in the year 1834 represented a value of only seven millions of pounds sterling; in the year 1866 it had reached the amount of 122 millions; decreased very considerably in the succeeding year, but in 1870 had again risen to 99 millions, of which 45 millions fall to imports and 54 to exports.

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